Study of the hoshin kanri strategy deployment elements in Sappi Kirkniemi Paper Mill

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Teknologiaosaamisen johtaminen

Kalle-Pekka Leppänen
Hoshin kanri- strategian jalkauttamisen elementtien tutkimus Sappi Kirkniemen paperitehtaalla.

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Tässä opinnäytetyössä tutkittiin strategian jalkauttamisen onnistumista Sappi Kirkniemen paperitehtaalla. Tutkimusta tehtäessä strategian jalkauttaminen tehtaalla oli muutettu Balanced Score Card:n käytöstä Hoshin Kanri- malliin ja menossa oli ensimmäinen vuosi uudella mallilla.

Työn tavoitteena oli kartoittaa hoshin kanrin elementtien toimintaa osastoilla sekä löytää kehityskohteita prosessin kehittämiseen tulevaisuudessa.

Jalkauttamisen onnistumista tutkittiin kahdella eri menetelmällä.

Ensimmäinen käytetty tutkimusmenetelmä oli kyselytutkimus jonka avulla strategian jalkauttamisen elementtejä tutkittiin toimihenkilöille lähetetyn kyselyn avulla. Vastaukset jaoteltiin osaston- ja organisaatiotason mukaan sekä analysoitiin jakaumia ja hajontoja tutkimalla.
Kyselytutkimuksessa havaittiin organisaatiotasolla ja osastotyypillä olevan suuri vaikutus tuloksiin.

Toisena tutkimusmenetelmänä käytettiin havainnointia osastoilla ja niiden viikkopalavereissa, joissa asiat käydään läpi osastokohtaisesti. Tuloksia vertailtiin osaston tyypin mukaan sekä tarkasteltiin tutkittavien elementtien kehittymistä ajan kuluessa.

Menetelmien avulla löydettiin seuraavia konkreettisia parannustoimenpiteitä seuraavan vuoden vuosisuunnitteluprosessin kehittämiseksi:

Alempien organisaatiotasojen (erityisesti työnjohtotaso) laajempi mukaanotto strategian jalkauttamisprosessiin tulevaisuudessa jo tavoitteiden asettamisvaiheessa.

Laajempi selvitys osastoille, joiden tulokset jäivät alhaiseksi. Erityisesti Energian tuotanto-osasto erottui joukosta alhaisilla pisteillä.

Tehdastason lisätarkastelu elementeille, jotka eivät ole kehittyneet ajan myötä osastoilla havaintotutkimuksen mukaan: Toimenpidelistojen käyttö, Projektien hallinta sekä Ideaprosessi.

Asiasanat: strategian jalkauttaminen, hoshin kanri, suorituksen hallinta, paperitehdas, PDCA, työryhmätaulu, gemba, BSC

ABSTRACT

Tampereen Ammattikorkeakoulu
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In this thesis the success of the strategy deployment was researched at the Sappi Kirkniemi Paper Mill. At the moment of the thesis done the way of the strategy deployment was changed from the usage of the Balanced Score Cards to the hoshin kanri. Mill was in the halfway of the first business year with the new model.

Objective of this thesis was to research the success of the hoshin kanri strategy deployment and different elements of it in Sappi Kirkniemi Paper Mill. After the researching the improvement proposals for the strategy deployment process for the future were pointed out.

The success of the deployment was studied by two scientific methods.

First method was the structured survey for the clerical workers at the Mill. The answers were divided by the type of department and organizational level. The results were analysed by evaluating the distributions and dispersion of the answers. In analyzing phase were founded out that organizational level and type of the department had significant effects for the levels of answers.

Second scientific method was the observation survey. Members of the mill management team participated and reported the observations from the departmental team board meetings. Results were evaluated by the type of department and also development over time per element was studied.

The following improvement points for the strategy deployment process in future has been discovered:

Extended participation of the lower organizational levels and especially supervisors for the next year annual planning process of the Mill (Catch-ball).

More detailed examination for the departments with the low results. Especially Energy Production department needs to be studied further.

Mill level examination for the hoshin kanri elements which were not developed over the time based on the observation survey: Action lists and follow-up, Project management and Idea process.

Key words: strategy deployment, hoshin kanri, performance management, PDCA, paper mill, teamboard, gemba, BSC

TABLE OF CONTENTS

SYMBOLS AND ABBREVIATIONS

SFPE	Sappi Fine Paper Europe
Hoshin kanri	Initially Japanese tool to strategy deployment
Hoshin- hheet	Paper sheet where the most important targets and measures are set for the Business year
PDCA	Plan-Do-Check-Act cycle for quality management. In hoshin kanri also CAPD (Check-Act-Plan-Do)
BSC	Balanced Score Card
PM	Paper Machine
PQM	Process and Quality Management
BY	Business Year, in SFPE from October to September
KPI	Key performance indicator
SPE	Sappi Performance Engine
Gemba	Japanese term for the place where value is added for the customer
FPS	Fischer production system
QCDE	Grouping of objectives in hoshin kanri (Quality, Cost, Delivery, Education)

1 INTRODUCTION

At the moment I write this thesis the European paper industry and especially printing/publishing papers has been in significant structural change for over than 10 years. Markets have decreased because of moving from traditional paper solutions to digital forms. Lots of production capacity is moved from Europe to China and other countries where the production costs are lower and growing markets are close to the production plants.

The way to survive for the European paper producers in this challenging competition situation is to be more effective in every area than the competitors outside Europe. This effectiveness can only be achieved when paper mills in Europe are using all of their resources in a optimum way.

In chapters 2 and 3 this thesis gives the overall picture about the hoshin kanri and Sappi Fine Paper Europe's Kirkniemi Mill.

The experimental part of this work explains the used methodologies and analyzed results out of them in chapter 4.

Summary and conclusion of the work is presented in chapter 5.

1.1. Objective of the thesis

Objective of this thesis is to research the success of the hoshin kanri strategy deployment and different elements of it in Sappi Kirkniemi paper mill.

Result of the thesis is the current status of the hoshin kanri elements in different organizational levels in paper production, maintenance and administration in paper mill environment after first 6 months of implementation.

This founded status of elements and other findings of the thesis is used for improving the mill level and departmental performance management and in addition next year annual planning process in Kirkniemi mill.

In this thesis the main focus starts from the annual objectives setting in the hoshin kanri process (see chapter 2.1.1). I made that selection because the most work in mill level strategy deployment is done on these parts and the previous parts are mainly done by the higher organization levels (Sappi Fine Paper European management team is this study).

1.2. Execution

Experimental part of this study consists of two different methodologies to find out what are the most important elements and what are the statuses of them.

First scientific method used is structured survey for the management and clerical workers at the mill. Execution, results and analyses out of this survey are presented in chapter 4.1.

Second method was the observation survey at the departments and especially in the team board meetings. In this method management team members took part of the departmental team board meetings as a role of the outside observer. Target was to observe how departments are really acting and working with hoshin kanri in daily life. This is explained in chapter 4.2 .

2 HOSHIN KANRI

2.1. What is hoshin kanri?

Hoshin kanri is initially Japanese method for the quality planning and management. Hoshin kanri is a Japanese term and can be translated as (Jolayemi, 2008):

> Hoshin = a compass, a course, a policy, a plan, an aim
> Kanri = management control of the company's focus

In literature occurs many different definitions what hoshin kanri is. From my point of view definitions from Dale, Akao, Jackson and Wood & Munshi sums up the most important parts of the hoshin kanri:

> Dale (1990) defines hoshin kanri as a process for developing plans, targets, controls, and areas of opportunities based on the previous level policy and on assessment of previous year results.

> Akao (2004) says that hoshin kanri is systems approach to management of change in critical business processes.

> Jackson (2006) underlines the people and learning side by saying that the most of all hoshin kanri is an organizational learning method and competitive development system.

> Wood & Munshi (1991) states that hoshin kanri is systematic method for focusing the activities of an organization on critical breakthrough areas.

Hoshin kanri consists of two different levels. First level is strategic planning (hoshin) and second level is daily management (kanri). Both of these levels has to be covered before the system is complete. This means that it is not just a process for the senior management to build visions and/or long term plans but also process for middle management and implementation teams to apply PDCA- cycle to daily life inside the company.

Hoshin kanri is working for the both directions in the organization: Top-down and bottom-up. Vision and long term plans coming from top to down and lower levels are giving their input to the process by improvement ideas.

Hoshin- model and interactions between different groups and tasks is presented in figure 1.

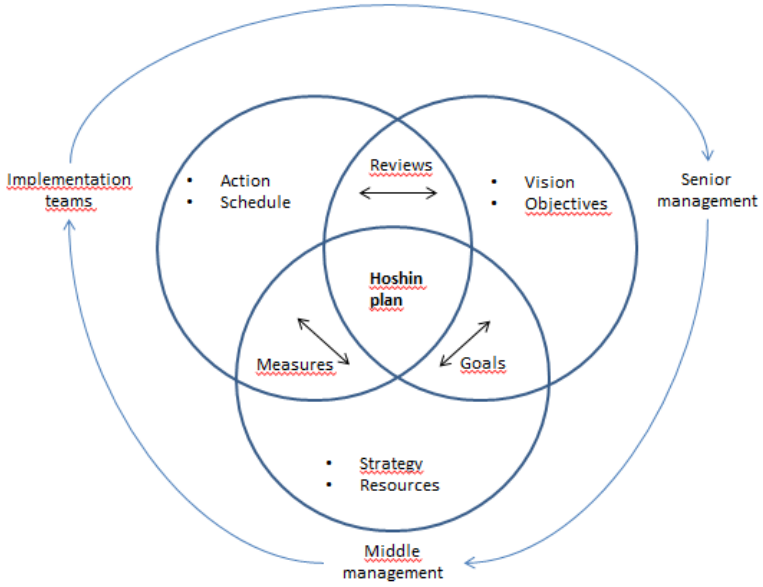


FIGURE 1. Hoshin model (revised from Akao 2004).

Hoshin kanri management differs a lot from the typical management systems. By vertical and horizontal alignment of the objectives, targets and means the aim is that the whole organization is working to the same direction. The focus in the management moves from results to the processes (from output to input) and leads to high performance in processes which is causing good results at the end. Difference between hoshin kanri and organization with conflicting targets is visualized in picture 1.

PICTURE 1. Comparison between extremes of management style (Hutchins 2008).

Tennant and Roberts (2000) are showing in a very simple and understandable way the fact that hoshin management (Breakthrough strategy management) is concentrating to improve the whole multifunctional processes instead of process improvements inside the silos. This change from the isolated process improvements to the company wide process redesign is one of the key points in hoshin kanri.
Comparison of the strategy management systems are shown in figure 2.

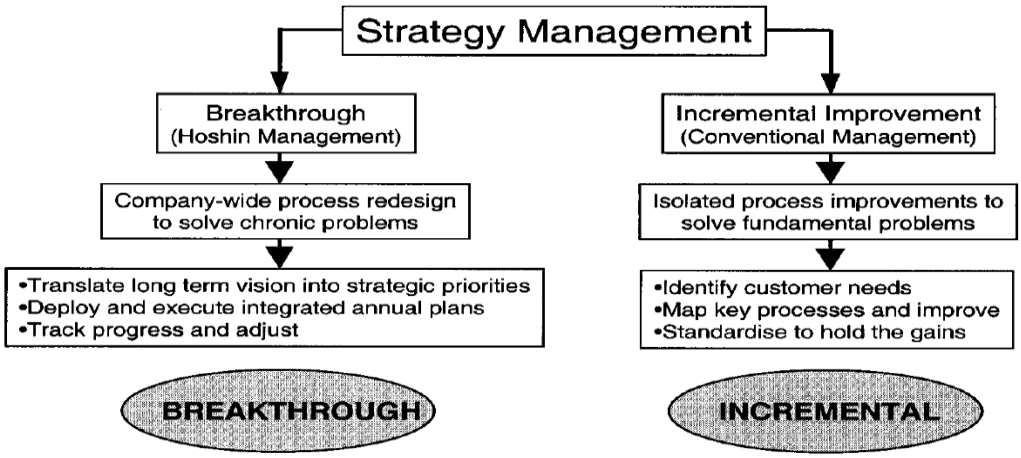


FIGURE 2. Breakthrough and incremental strategy management (Tennant and Roberts (2000).

Hoshin kanri can be used very widely for managing the change. According to Jackson (2006) hoshin kanri is applicable to almost everything that moves inside the companies:

- Integrate value stream activities within the single plant, office, hospital etc.
- Integrate a total value stream involving multiple suppliers
- Launch a new product or service
- Manage a brand portfolio or bundle of related products and value streams
- Manage strategic change programs
- Manage the implementation of lean manufacturing or six sigma
- Manage any complex project that involves cross- functional cooperation
- Manage companies in an equity fund portfolio to systematically improve their profitability

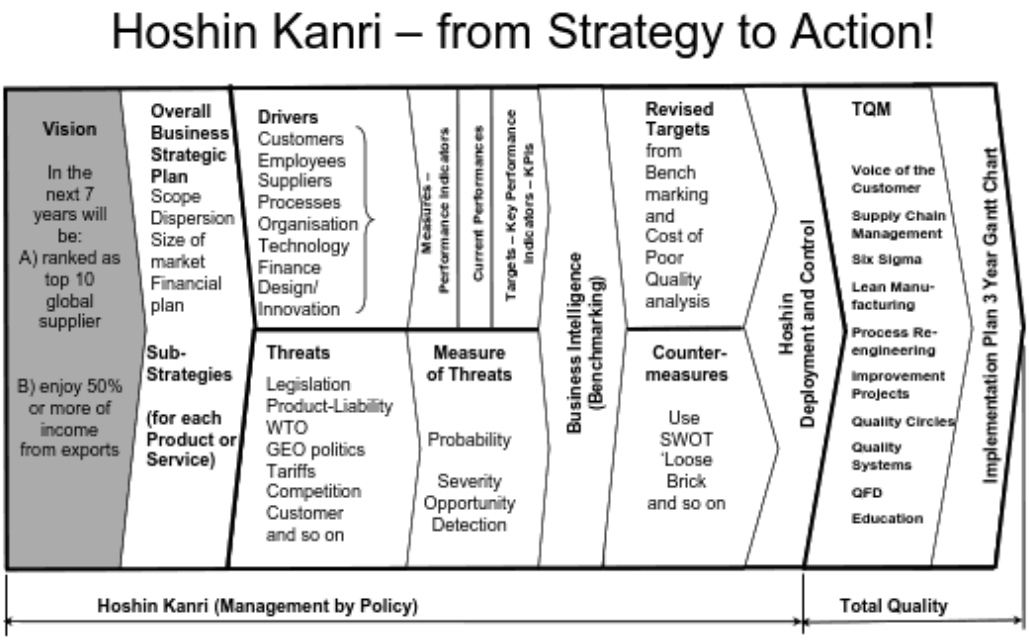
2.1.1 Hoshin kanri process

There can be found many different definitions about the hoshin kanri process in literature. Process descriptions are varying from each other in detailed level but in big picture these processes are following the same principle. All of these processes are starting from the mission, vision and/or long term plan and via target alignment process ends up with the daily management. Next I am presenting a selection of the hoshin kanri processes taken out from the literature, these processes have helped me to understand the process and different elements on it.

Akao (2004) sets the ten steps for process of policy deployment as following:

1. Establish a company motto, quality policy and promotion plan
2. Devise long- and medium-term management strategies
3. Collect and analyze the information
4. Plan the targets and means
5. Set control items and prepare a control item list
6. Deploy the policy
7. Deploy the control items
8. Implement the policy plan
9. Check the results of implementation
10. Prepare the status report for implementing hoshin kanri

Hutchins (2008) presents his view about the hoshin kanri process and Total quality management like shown in picture 2.



PICTURE 2. Hoshin kanri process from strategy to action (Hutchins 2008).

Jolayemi (2008) states process from vision to implementation and follow-up as in figure 3.

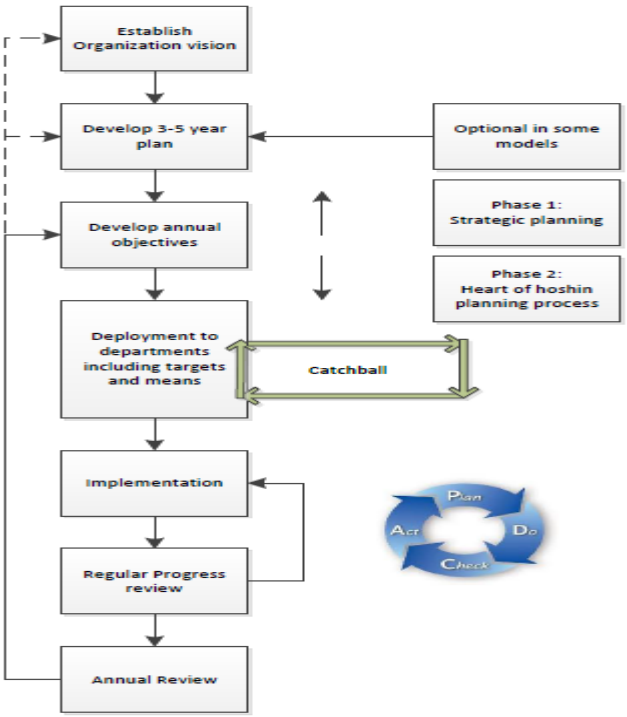


FIGURE 3. Hoshin process (revised from Jolayemi 2008).

These processes with the main steps in hoshin kanri process and also relations with PDCA- cycle and hoshin kanri are explained in detailed level in the next chapters 2.1.2 and 2.1.3 of this thesis.

2.1.2 Key elements of the hoshin kanri

Vision:

Hoshin kanri process, and practically hoshin part of it starts from the vision. There are no clear rules for making a vision for company, but it is always unique statement about where company wants to be in the future. In hoshin kanri processes vision is normally made for next 7 years. Hutchins (2008) writes that vision can sometimes be dreamy and imprecise but it can readily be converted to goal if it had relevant metrics to determine the parameters for achievement.

Long term plan:

Second phase in the hoshin kanri process is the creation of the long term plan. In hoshin kanri the timeframe of the long term plan is normally from 3-5 years. According to Jackson (2006) company makes the 3-5 years planning horizon with a set of breakthrough objectives that links company's strategic intent to multi-annual objectives of normal operations. The team chooses breakthrough objectives to eliminate specific gaps between the company's vision and its current capabilities.

Annual objectives:

Next process step is the setting of the annual objectives. In this phase the management is setting the few most important objectives for the next year. Liker & Franz (2011) are underlining that the level of detailing the annual objectives is one major difference between the hoshin kanri and traditional target setting process. In hoshin kanri it is very important that in this phase only few vital objectives is taken in.

Viitala (2008) says that: People are noticing the things that they are aware and what they experience as relevant. Only after putting the attention to things it is possible to get observations out and these observations are enabling actions (Revised from Viitala 2008).

Target of the selection of few vital topics is that the whole organization is concentrating the most important points instead of trying to change, fix and control everything.

Targets and means deployment:

After the annual objective setting, the targets and means are deployed to the organization. This is done in a team workshops where the horizontal and vertical alignment of the targets and means is done. Process called catch-ball is taking place in this step, catch-ball process is clarified in the next chapter 2.1.3 of this thesis with its relation to the PDCA- cycle.

Implementation:

When targets and means are deployed to the organization starts the concrete implementation of the system. Selected targets are communicated to the whole personnel, translated to the Key Performance Indicators (KPI's) for the departments and workgroups and the team boards are installed to visualize the performance. Result of this step is that daily management can be started with commonly understood targets and KPI's.

Daily management:

By daily management the whole organization is following and improving the performance of the selected most important topics. Daily management links together the vision, long term plan, annual plan and daily activities in the company. Every employee of the company is able to give his/her input for the hoshin kanri process by following the right topics and making improvement ideas to improve the processes further.

Moran (1991) listed the benefits of the daily management as:

- Clear understanding of needs and expectations
- Process to communicate with the teams
- Fact driven teams

Annual review:

Jackson (2006) states that at the end of the strategic improvement cycle, the entire company must return to PDCA-cycle again. Looking back to results achieved and on problems and surprises encountered.

In this stage the management is making the gap analysis of the achieved performance and set goals. Next year strategic planning starts from the annual review.

2.1.3 PDCA- cycle in hoshin kanri

The PDCA- cycle (also known as Deming cycle) is the widely used quality management tool. Cycle contains four stages: Plan, Do, Check and Act.

The phases and steps of the cycle is shown in picture 3.

Phase	Step	Content
Plan	1	Analyses the current conditions and finds out the existent problems.
	2	Finds out various causes resulting in those problems.
	3	Identifies the major factors from various causes.
	4	Works out the solution and improvement plan according to the major factors.
Do	5	Carries out the plan and measures.
Check	6	Checks the implements according to requirements of the plan.
Action	7	Summarizes experiences and consolidates achievements.
	8	Turns problems that haven't been solved or appear newly into the next cycle.

PICTURE 3. Four phases and eight steps of PDCA- cycle in performance management (Du et al 2008).

PDCA- cycle is the heart of the whole hoshin kanri and continuous improvement and it is used in many ways and for many different purposes. In the organizations where hoshin kanri is fully implemented the cycle is affecting for every person and every function in every day. Senior management is using it for giving the direction, follow-up and continuously improve the whole organization. Middle management is aligning departmental actions and targets to support the upper level cycle and by the daily PDCA is ensured that daily work is supporting and developing the way how people are working all the time. The frequency (turning speed) of the cycle is increasing when going down in the organization.

In annual cycle the starting point is *act*, where top level management is presenting the next year points to concentrate (vital few objectives) to the next level of the organization. Figure 4 presents the connections with annual hoshin and the PDCA- cycle.

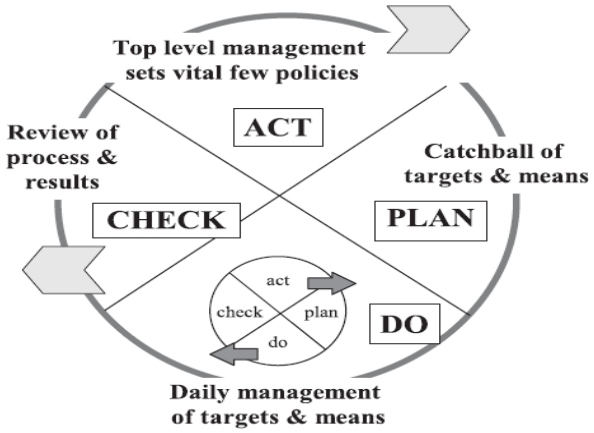


FIGURE 4. Annual hoshin and PDCA- cycle.(Witcher 2002).

After the communication comes to next phase *plan*, where the process called "catch-ball" is taking place. In catch-ball the different areas and departments are setting the realistic targets based on vital few objectives for the next year together and ensure that targets and means are not conflicting each other. The catch-ball is very important for horizontal alignment of the targets and enables cross functional management. For the managers who are participating the catch-ball this process is place to give their input to targets, have the common understanding about the company's next year targets and involve themselves to common targets.

Kondo (1998) states that the catch-ball ends after the opinions of as many people as possible right down to the front line have been incorporated and information is fed up to top management through the hierarchy (Revised from Kondo 1998).

The result out of the catch-ball is the group of nested PDCA cycles where all participants are seeing their roles clearly and have the buy-in for the reaching of the annual targets.

FIGURE 5. Nested PDCA cycles (Revised from Jackson 2006).

In next phase *do* the targets and means are deployed to the daily management where continuous processes are taken into control as part of normal daily operations.

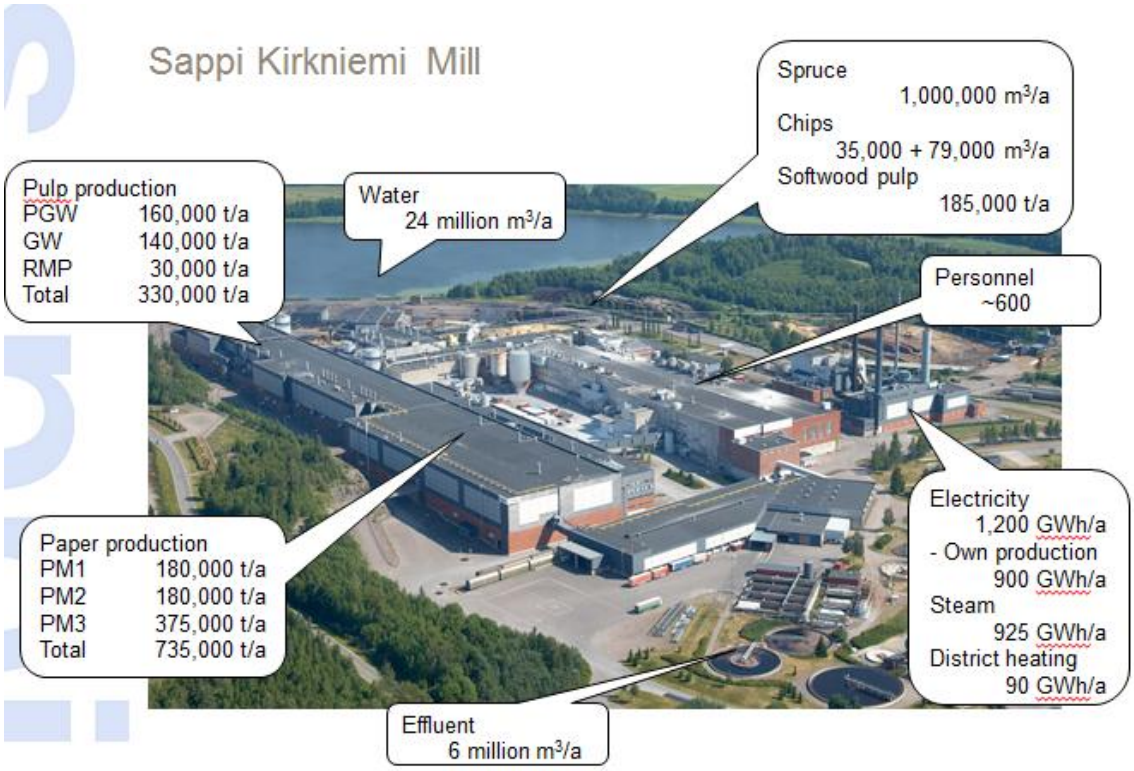
In *check* phase the results out of the processes are checked continuously and if needed the corrective actions are set.

In daily management (kanri) the PDCA- cycle starts from the check phase and can be seen as CAPD- cycle.

3 SAPPI KIRKNIEMI PAPER MILL

3.1. Sappi Kirkniemi in a nutshell

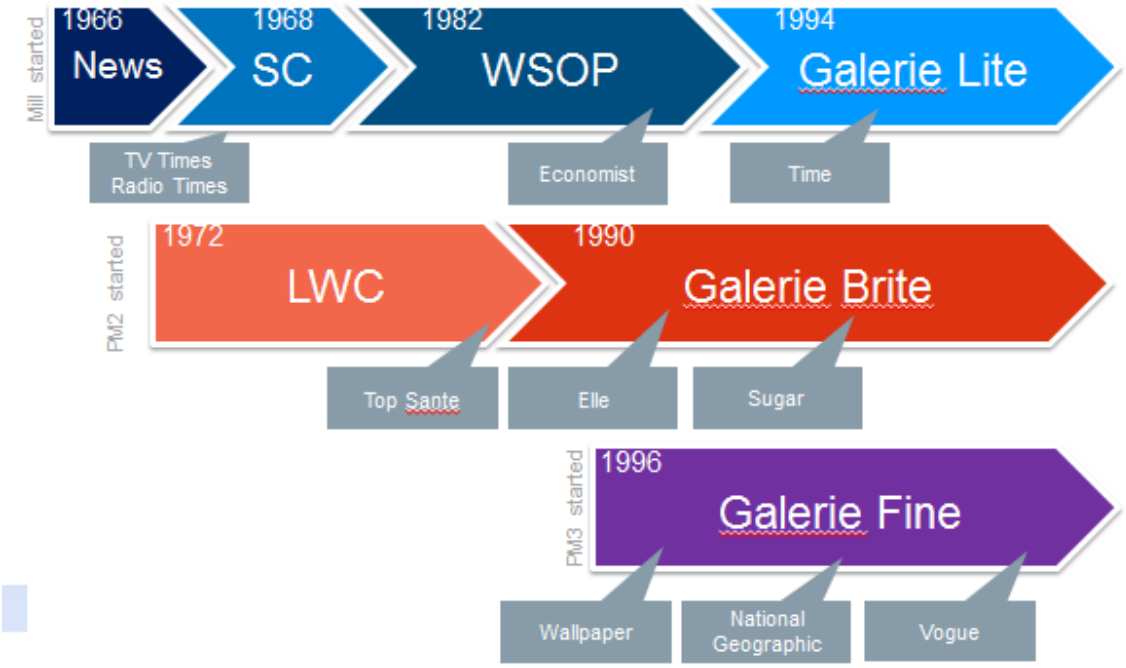
Sappi Kirkniemi is part of the Sappi Fine Paper Europe (SFPE). SFPE:s headquarters are located in Brussels. SFPE have paper production in Germany (3 mills), Netherlands (2 mills), Belgium (1 mill), Austria (1 mill) and Kirkniemi Mill in Finland. Kirkniemi Mill is located in Lohja, Southern Finland. Picture 4 gives the overall picture and key numbers of the Kirkniemi Mill.



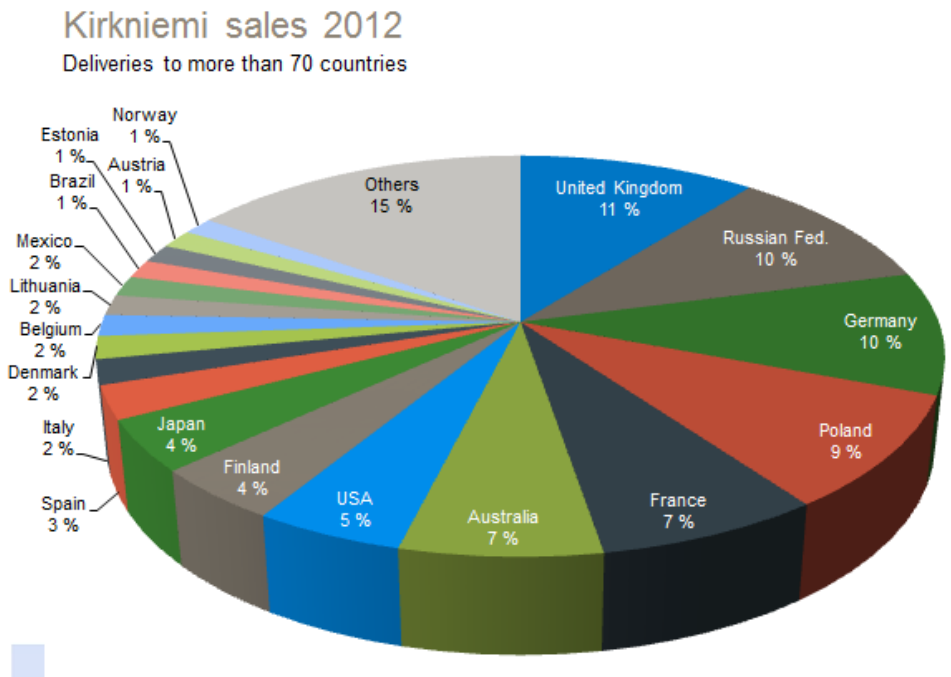
PICTURE 4. Overall picture of the Sappi Kirkniemi Mill

3.1.1 Kirkniemi Mill products

Sappi Kirkniemi mill is producing coated mechanical publishing papers. Products are splitted to the three product groups: Galerie Lite, Galerie Brite and Galerie Fine. Picture 5 shows the product development during the years starting from 1966. Kirkniemi mill sales distribution is presented in picture 6.



PICTURE 5. Product history of the Sappi Kirkniemi Mill



PICTURE 6. Sappi Kirkniemi Mill sales distribution by countries 2012

3.1.2 Kirkniemi mill machinery

Kirkniemi Mill has 3 paper machine lines. PM1 was built in 1966, PM2 in 1972 and PM3 in 1996. All of the machine lines are producing coated paper (PM1 is on-line coated, PM2 and PM3 has separate off- coating machines). Integrated mechanical pulp mill is producing all the mechanical pulp needed and chemical pulp for the paper machines is bought from the outside markets.

Picture 7 is showing more detailed information of the Kirkniemi paper machines.

Kirkniemi machinery

	Galerie Lite	Galerie Brite	Galerie Fine Galerie Fine Silk
	35 – 54 g/m²	57 – 80 g/m²	65 – 90 g/m²
Machine	**PM1 Kirkniemi**	**PM2 Kirkniemi**	**PM3 Kirkniemi**
Constructed	(1966) 1982 / 1994	1972 / 1989	1996
Capacity	180 000 t/a	180 000 t/a	375 000 t/a
Type	Twin-wire	Fourdinier	Gap former
Trim width	6.48 m	6.43 m	8.30 m
Average speed	1300 m/min	1100 m/min	1400 m/min
Coating technology	On-line film coater	Off-line blade coater	Off-line double coater
Finishing	3 supercalenders 1 winder	2 supercalenders 2 winders	2 supercalenders, 1 silk calender 2 winders
Customer reels			
- Width	400 – 2600 mm	400 – 2600 mm	430 – 2600 mm
- Max dia	1250 mm	1200 mm	1250 mm
- Core dia	76 mm	76 mm	76 or 150 mm
Furnish	Pressurized refining mechanical pulp (PRMP) Groundwood Chemical pulp (ECF)	Groundwood Chemical pulp (ECF)	Pressurized groundwood pulp Chemical pulp (ECF)

PICTURE 7. Sappi Kirkniemi Mill machinery

3.1.3 Kirkniemi mill people and organization

Totally around 600 people are working inside the Kirkniemi Mill area. 540 people are working straight to the mill and around 60 persons are working in different shared/central functions but have offices inside the mill area. In this thesis the focus is in the mill people and I excluded central resources because their hoshin kanri- process starts from different central organizations and even the people are working physically at the mill and supporting the mill with their contribution their main targets are coming from outside the mill.

Kirkniemi main organization chart is shown in appendix 1.

3.2. Strategy deployment in Kirkniemi Mill

Until the year 2013 strategy deployment in the Kirkniemi mill was done with the Balanced Scorecards (BSC). This process started from the creation of the vision (for the next 5 years) for the mill. Annual main points to concentrate for the next year were deployed out of this long term plan. Mill level scorecard summed up the key performance indicator for the whole mill. This long term planning and mill level balanced scorecard was done by mill management team. Mill level scorecard was then presented to the department managers and this was the starting point for the departmental annual planning and target setting process. Department managers were developing departmental scorecards and presented those cards to the other departments and mill management. Department BSC:s were approved and aligned in the annual planning meetings.

On March 2013 Sappi Fine Paper Europe launched the program called Sappi Performance Engine. One major part in this program was to move all SFPE:s units to hoshin kanri- based strategy deployment. In Kirkniemi this meant change to move from the balanced scorecards to the hoshin planning.

By Witcher & Chau (2007) The idea of the balanced scorecard's four perspectives is similar to one used within hoshin kanri. This is the QCDE grouping of objectives used in hoshin kanri, where quality objectives and measures (Q), are comparable to those in the scorecard's customer perspective, because the customers ultimately define what quality means; Cost (C), similarly covers financial objectives and measures; Delivery (D), covers process objectives in a similar way to the internal business perspective, and education (E), objectives resemble learning and growth and cover people-based objectives and measures.

Kaplan & Norton (2004) are presenting in their book Strategy maps the interesting "equation" for the breakthrough results:

[Breakthrough results]=[Describe the strategy]+[Measure the strategy]+[Manage the strategy]

The philosophy of these three components is that

- You can't manage (third component) what you can't measure (second component) and
- You can't measure what you can't describe (first component)

This equation and the philosophy behind it fits also very easily to the hoshin kanri thinking.

Even if the balanced scorecards and hoshin kanri has lot of the common elements the change for the mill was significant. Departmental targets from the balanced scorecards became personal targets in the hoshin sheets. Also the process where corrective actions are set out of the target variations instead of just discuss about the problems was a big and challenging change for the people in the mill organization.

To support this change from balanced scorecards to the hoshin kanri SFPE decided to bought help from the external company. Total 110 senior managers from SFPE visited German company Fischer for three days workshops to learn what hoshin kanri is and how to implement it in different circumstances and locations. Fischer is manufacturing company of the fixing systems for construction industry and many kind of different parts for the automobile industry. With their own production system FPS (Fischer Production System) they have been able to maintain their competitiveness in the hard markets against Asian manufacturers. Hoshin kanri strategy deployment is one vital elements of the FPS. From Kirkniemi mill 7 people participated these workshops, where FPS was introduced in practice.

First Hoshin- Sheets to the mill were created with the help from Fischer consulting during July 2013. The first sheets were created for the Sappi Business year 2014 (October 2013 – September 2014). Local CI-Expert participated the whole mill level process.
The process of the sheet creation is presented in figure 6.

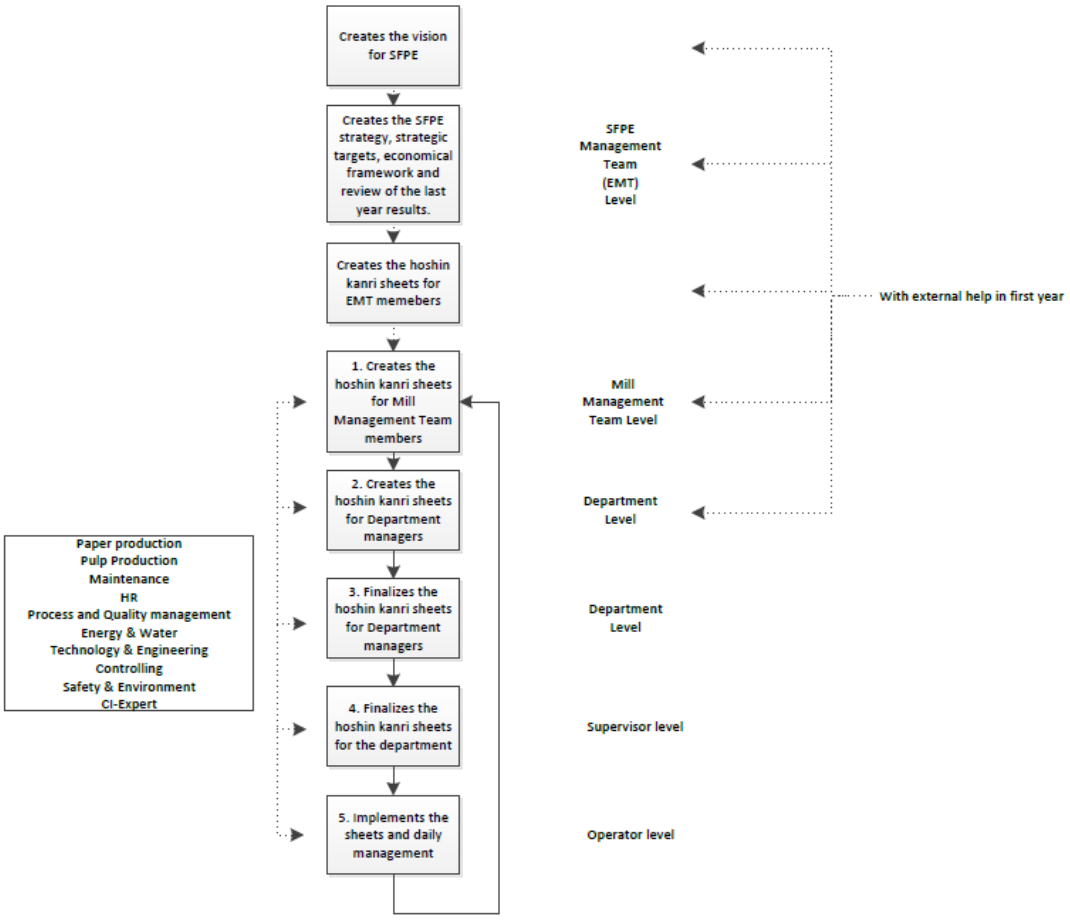


FIGURE 6. Hoshin Kanri process in Kirkniemi mill.

In the first phase (1) Mill management team created their sheets based on the higher level (European management team) targets.

In the next step (2) hoshin kanri sheets were created for department managers. This departmental creation was done as a teamwork together with the Mill management team and department managers. Every department manager took part of the 1 day session where 1st versions of the horizontal and vertical target alignment were done (catch-ball).

After the first workshop every department continued their process and finalized the sheets of the department manager (3). In this step the co-operation was done between the departments to ensure that targets of the different departments are not contradictory.

The next step of the process (4) was the target deployment to supervisor level. This was done by Department manager.

Final step in the process (5) was implementation of the sheets and daily management. This was done quite differentially in different departments depending the type of the department.

3.2.1 Hoshin kanri sheets in the Kirkniemi mill

Strategy deployment in the Kirkniemi Mill is based on the personal hoshin kanri-sheets. Mill level top down deployment (vertical alignment) starts from the Mill Managers sheet and continues until supervisor level.

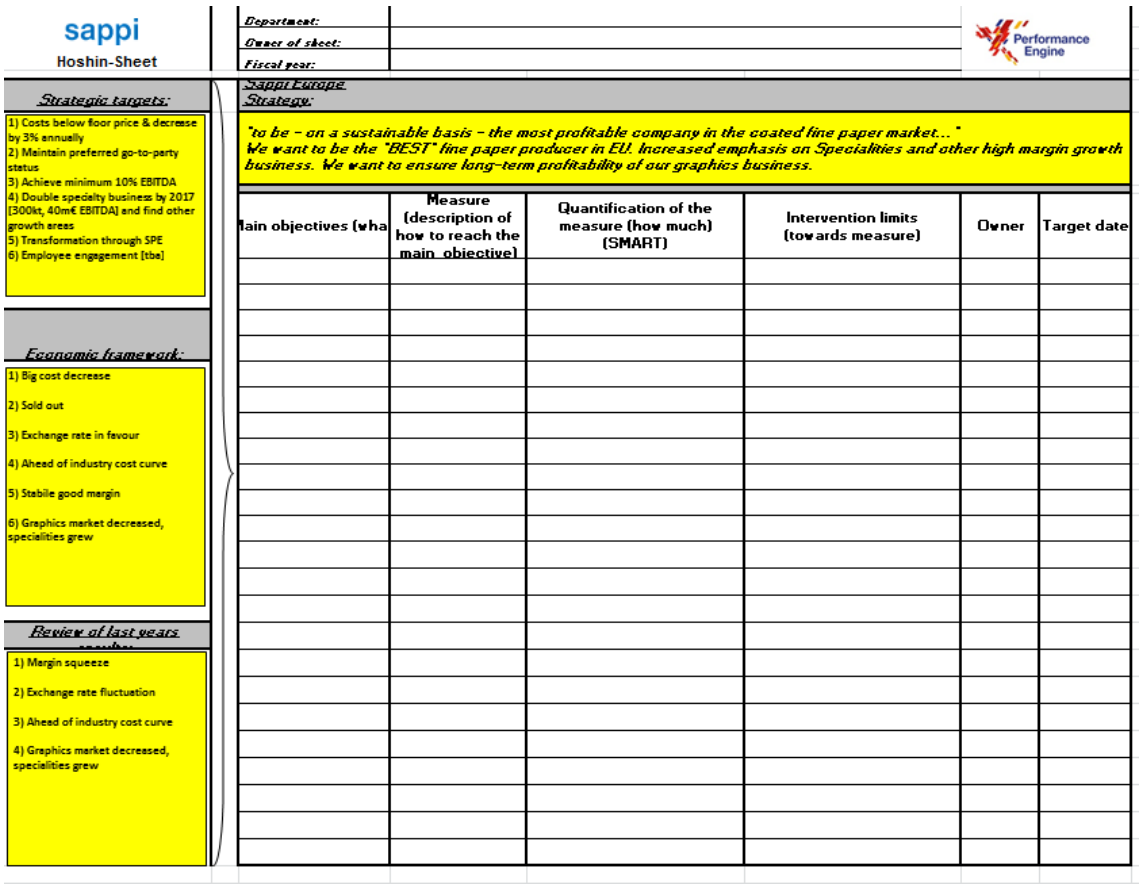
Everyone who have direct reports in the mill organization have one personal sheet. In addition some people in expert functions have the sheets also. Total 48 people have own sheet in the Mill. To ensure the top-down (vertical) alignment and to prevent contradictory targets (horizontal alignment) the person of the one organizational up always approves the sheet of his/her direct report before the sheet is official.

People who don’t have the sheets are supporting the strategy by executing actions and generating improvement ideas. Actions are linked to higher level targets and from higher level targets to strategy. Hoshin kanri- sheets are created for one business year at the time (annual hoshin) and the content of the sheet is fixed for the whole business year.

Every hoshin kanri Sheet in SFPE consist the Sappi Fine Paper Europe strategy, Strategic targets, Economical framework and review of the last year most important business results. These elements (marked in yellow in every sheet) are not mill specific and mill is not able to change them. Other parts of the sheets are varying from mill to mill and mills are able to revise the content of their sheets.

Topics of the sheets are:

- Main objectives
- Measure
- Quantification of the measure
- Intervention limits
- Owner
- Target date



PICTURE 8. Empty hoshin kanri- sheet

Every hoshin sheet is presented at the company intranet site and all of the employees have read access to all sheets. For me it is very important that main targets of the every business unit and department are presented transparently in the intranet.

3.2.2 Managing the performance at the team boards

Performance management in the Kirkniemi mill is based on the PDCA (CAPD)- cycle. Planning, doing, checking and acting in concrete level is done at the departmental team boards.

At the team boards the departments are showing their performance visually based on department manager's hoshin- sheet.
Team board includes visualization of department managers hoshin- sheet, the progress of the selected key performance indicators with the target levels and intervention limits, corrective action lists when target levels are not met and if needed the plans / projects about the most important issues for the department. Some departments are using the team boards also for showing other important info for example root cause analysis out of the problems. Mill management team has defined the structure for the team board meetings at the mill. This structure is shown in figure 7.

Department	Time	Location
PM1/2	Mon-Fri 8:30 - 9:15	PM2 Dry end control room
PM3	Mon-Fri 8:30 - 9:00	PM3 Wet end control room
Pulp mill	Mon-Fri 8:00-8:30	Pulp production control room
Energy/Water	Mon-Fri 8:45-9:00	Power plant control room
PM1/2 Maint.	Thu 9:00-10:00	Maintenance group coffee room
PM3 Maint.	Thu 9:30-10:00	Meeting room Watti
Pulp mill Maint.	Wed 9:00-9:30	Maintenance group room Monttu
En./Water Maint.	Wed 11:40-12:00	Automation maintenance group room
PQM	Thu 10:00-10:45	PQM team room
HR	Mon 8:15-9:00	HR / Kati's office
T&E	Fri 09:30-10:30	Meeeting room Plaani
Laboratory	Thu 11:30-12:15	Meeting room Välkkylä
Controlling	Tue 9:00-9:30	Janne's room
Safety	Fri 8:00 – 8:30	PM3 Office
Spare parts	Tue 13:00-13:30	Spare parts coffee room
Infrastructure	Wed 9:00-9:30	Meeting room Meku
Central workshop	Thu 11:30-12:00	Central workshop coffee room

FIGURE 7. Team board meetings at the Kirkniemi mill

To make the participation of the lowest organization level easy, all team board meetings are held as close to operations as possible. Production meetings are held in the control rooms, maintenance meetings in maintenance coffee room's etc.
Frequency of the team board meetings varies from department to department but every department have their meeting at least once per month. Most of the departments are having the meetings once per week.

Participants of the meetings are depending of the department:
In production areas the operation manager is leading these meetings and engineers and supervisors from maintenance and production are participating. Operators from the production areas are also invited to the meeting, but participation rate is low at the moment I write this thesis.

In maintenance teams the maintenance engineers are leading the meetings and supervisors and maintenance operators are participating.

In Laboratory, laboratory supervisor is leading the meeting and laboratory operators are participating the weekly meetings.

In administrative departments (Controlling, HR, Safety, PQM, T&E,..) the chairman of the meeting is normally from the department manager level, in Controlling and HR, leader is from the management team.

3.2.3 Management team go to gemba visits

Management team members are participating the team level meetings at least once per month as a part of their monthly go to gemba. Ohno (2013) says that the Gemba- philosophy fits also administrative departments and visits are covering all departments at the mill.

Gemba visits are reported and reports are visible for everybody in the mill. Management team Go to Gemba report including hoshin kanri related items is shown in picture 9. These reports were used to evaluate the departmental status of the hoshin kanri elements explained in chapter 4.2. in this thesis.

Go to Gemba	Participant			
Department: Date:				
Safety				**Comments**
* Lost time incidents				
SARA notifications * number / processing * jäännösriskit				
* BBS rounds / number				
* safety flash / department				
Performance management				**Comments**
* Hoshin sheets				
*Visualization of the indicators				
* Actions if targets are not met				
* Action lists				
* projects (topics, timetables, responsibilities, follow-up)				
* ideaprocess (new ideas, processing, feedback)				
Department visit				**Comments**
* Safety				
* 5S				
* Cleanliness and order				
* Personell knowledge about the targets and				
Go to Gemba General comments				

PICTURE 9. Management team members monthly go to gemba report

4 EXPERIMENTAL

Base scientific problem in this thesis is: What is the current status of the hoshin kanri elements in the Kirkniemi Mill after first 6 months of implementation?

There are many perspectives for this question:

- What is the influence of the organizational level?
- What is the influence of the type of the department (production, maintenance, administrative)?
- What is the influence of the size of the department (how many people are working in department)?
- What is the influence of the work in 5 shifts or dayshift?

I selected two different methodologies to find out the answer for these questions.
An Overview of the experiments done in this thesis is shown in figure 8.
The following chapter contains the more detailed information about the experiments made. Methodologies are used to support each other to finally find the fact based current status of the hoshin kanri elements and points to improve further in future.

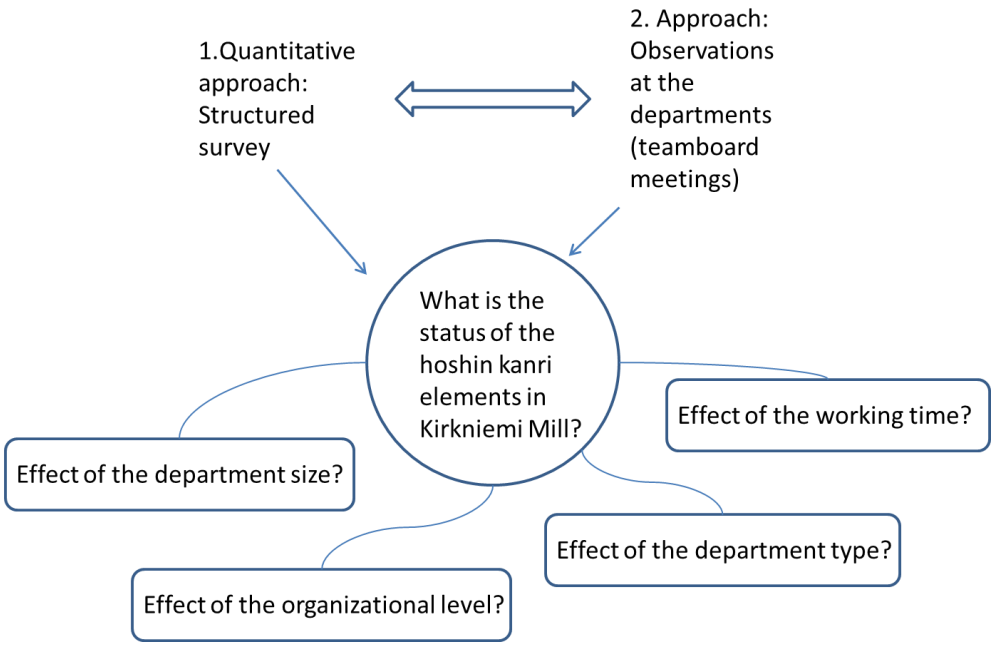


FIGURE 8. Scientific approaches to research problem

Krishnaswami & Satyaprasad (2010) stated following about the used scientific methods:

Survey (structured survey in this thesis) is the "fact finding" study. It is the method of research involving collection of data directly from a population or a sample there of particular time. Data can be collected by observation, interviewing or mailing questionnaires.

Field studies (observation survey in this thesis) are scientific enquires aimed at discovering the relations and interactions among sociological, psychological and educational variables in social institutions and actual life situations like communities, schools, factories, organizations and institutions.

4.1. Structured survey: Elements of Hoshin kanri

Target of the structured survey was to find how people from the different organizations and organization levels at the Mill sees the quality of the different elements in the existing strategy deployment by hoshin kanri.

Salo (2006) found out in his doctoral thesis that questionnaires can be utilized in strategy processes and they give valuable input to business strategy and the strategy process. He also say that capturing and leveraging human intuition, especially that of the middle management, makes the strategy process and its implementation more efficient. These findings from Salo have been taken in to account in the survey creation process.

Questionnaire based on 32 questions about the Strategy, Main targets, Performance indicators, Improvement actions and Team board meetings. The set of the questions was same for every participant. Questions were scaled from 1-5 (Very good, good, moderate, poor, very poor). All questions in the survey were mandatory and participant has to select only one answer per question. This questionnaire is shown in the appendix 2.

4.1.1 Execution

In this study I did a structured survey for total 31 persons in different levels of the mill organization. Highest organizational level was Mill Management team.

Next level studied was the Department Managers. Managers from the Paper machine lines, Pulp production, Maintenance, Process and Quality, Technology and engineering, Environment and Energy production took part in the survey in the meaning to have the complete picture about the elements of hoshin kanri also from the department manager level.

Still going down in the organization the engineer level took part in the survey. Engineers from the different organizations in the mill participated and gave their feedback about the hoshin kanri elements.

Lowest level in this survey was the Team Leaders and Supervisors. Selected people was studied in aim to find how well the strategy deployment has reached the lowest organizational level who have their own personal targets based on the hoshin kanri for the business year.

In this survey I excluded the operator level because at the moment operators don't have their own hoshin kanri- sheets and in performance management their task is to follow selected KPI's and create actions and ideas to help the team leaders and/or supervisors to reach the target levels for the Business year.

Participants were divided to the groups as following:

1) Level in organization:
    a. Management team members
    b. Departmental manager level
    c. Engineering level
    d. Supervisor level
2) By the departments where participants are working:
    a. Production
    b. Maintenance
    c. Others, including HR, PQM and other administrative areas

4.1.2 Results

Results of the survey are presented in total and per every element (Strategy, Targets, Indicators, Actions and Team board meetings). Results are analyzed in next chapter 4.1.3 and proposals for the next steps can be found from chapter 5 of this thesis.

In these summary graphs, all answers from every question per element are calculated together to get the whole picture about the selected element.

Results are visualized, presented and analyzed with histograms, normality checks and boxplots. Histograms are useful to show data distribution and normality. Boxplots are used to see variation and levels of the answers per element evaluated. (Revised from Karjalainen & Karjalainen 2008). I also included the evaluation against the normal variation to see how normally the data has been distributed. Cox (2009) stated that in the traditional approach it is assumed that individual random variables are normally distributed with mean μ and variance σ.

Survey total (all questions, all answers):

Figure 9 presents the graphical summary of all answers. Overall level of answers is quite high and level 4 "good" have the biggest amount of answers. Mean of the all answers is 3.6469. Distribution of the answers is following the normal distribution.

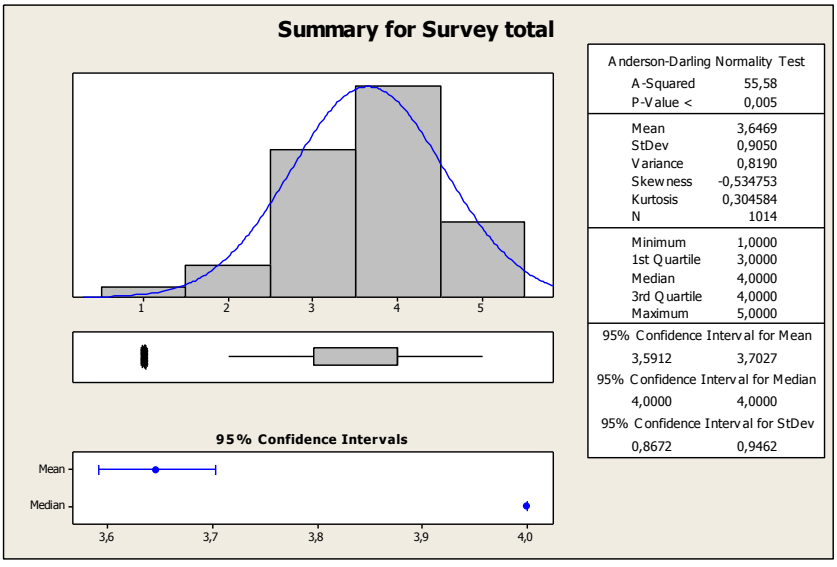


FIGURE 9. Graphical summary of survey total.

When looking the effect of the organizational level inside the mill figure 10 shows that the higher you go in the organization, higher scores you get. Figure 10 presents the box-plots of all questions divided by the organization level.

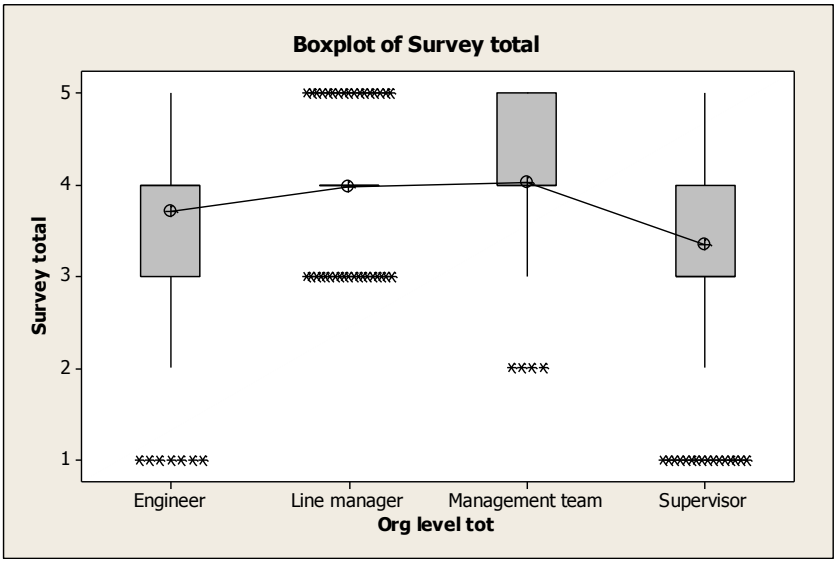


FIGURE 10. Boxplots of survey total per organizational level.

Figure 11 presents the answers for all questions divided by the type of department. Maintenance is having the best results and others and production are following.

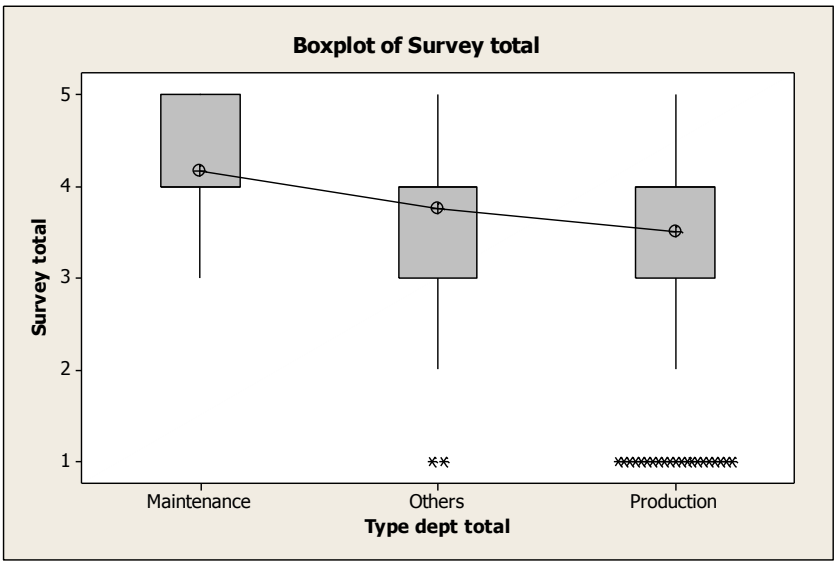


FIGURE 11. Boxplots of survey total per type of department.

Strategy:

Figure 12 presents the graphical summary of all answers related to strategy. Overall level of answers is quite high and level 4 “good” have the biggest amount of answers. Mean of the all strategy related answers is 3.6696. Distribution of the answers is following the normal distribution

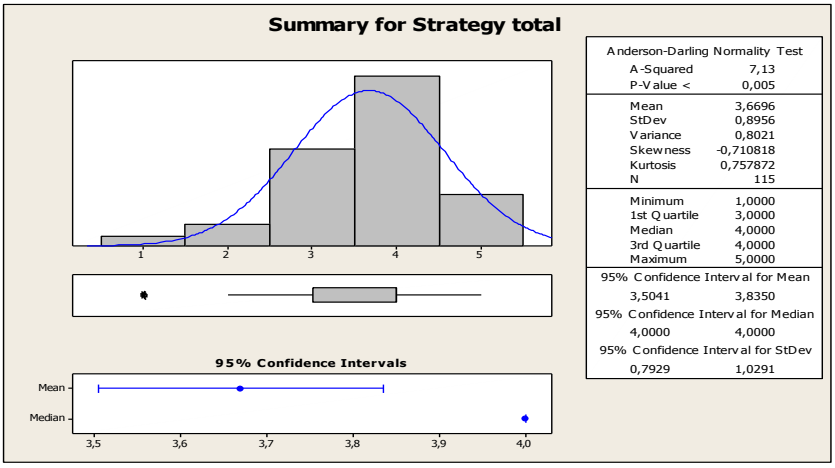


FIGURE 12. Graphical summary of strategy total.

When looking the effect of the organizational level inside the mill about the strategy related questions it is clear that the higher you go in the organization, higher scores you get. Figure 13 presents the boxplots of the strategy related questions divided by the organization level.

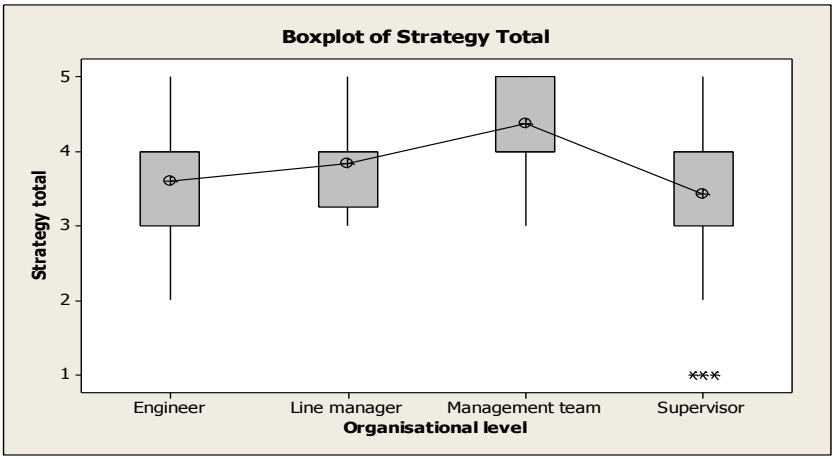


FIGURE 13. Boxplots of strategy total per organizational level.

The main effects plot, presented in figure 14 underlines the effect of the organizational level. Supervisors have clearly the lowest scores and also engineer level is below the mean line. Management team is having very high scores in this graphical analyze.

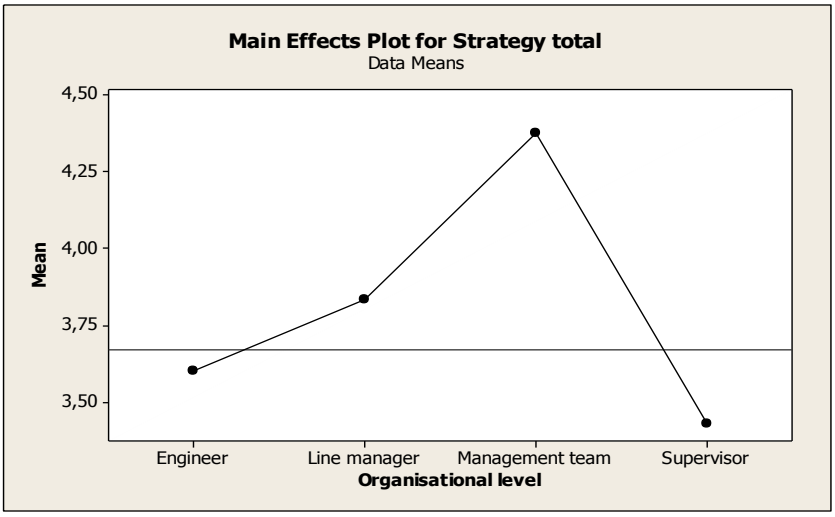


FIGURE 14. Main effects plot of Strategy total per organizational level.

Figure 15 presents the answers for the strategy related questions divided by the type of department. Maintenance is having the best results and others and production are following.

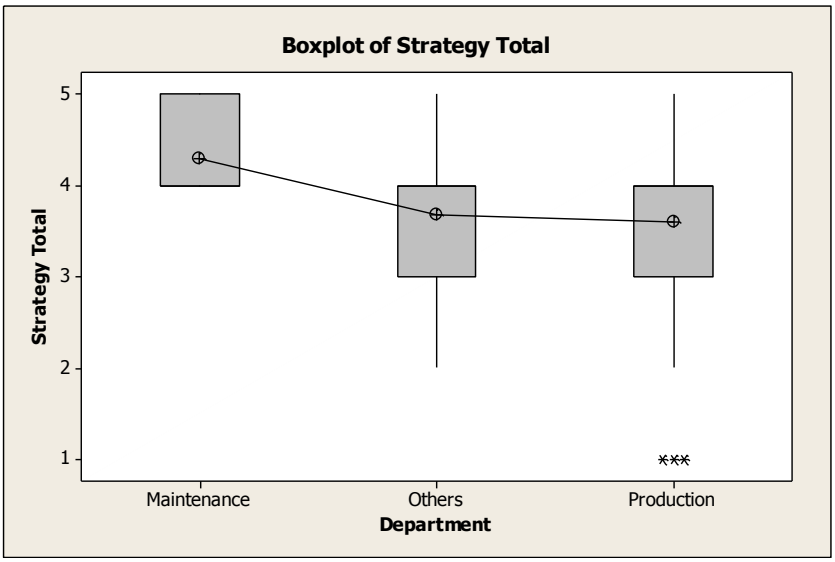


FIGURE 15. Boxplots of strategy total per type of department.

From the main effects plot in figure 16 it is very easy to see the big difference between the different types of department. Maintenance is jumping up with the very high scores and production is clearly below the mean line.

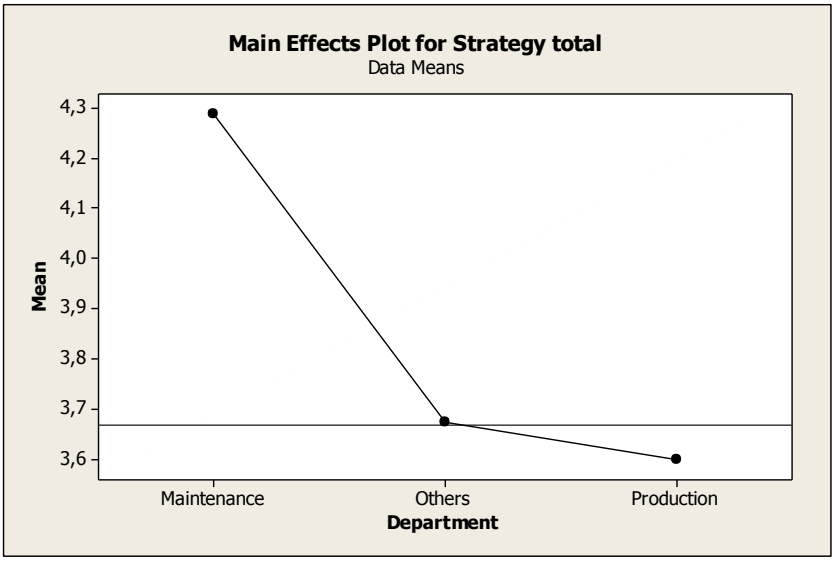


FIGURE 16. Main effects plot of Strategy total per type of department.

Targets:

Figure 17 presents the graphical summary of all answers related to targets. Overall level of answers is quite high and level 4 “good” have the biggest amount of answers. Mean of the all strategy related answers is 3,6290. Distribution of the answers is following the normal distribution

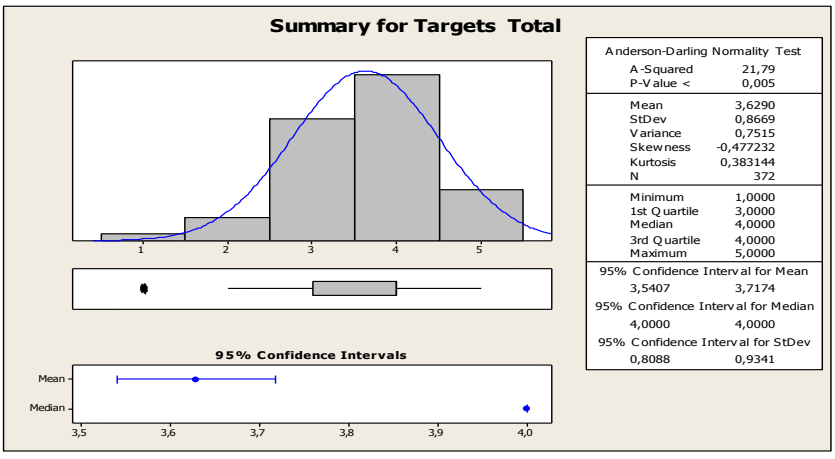


FIGURE 17. Graphical summary of targets total.

When looking the effect of the organizational level inside the mill about the targets related questions it is clear that the higher you go in the organization, higher scores you get. Figure 18 presents the boxplots of the strategy related answers divided by the organization level.

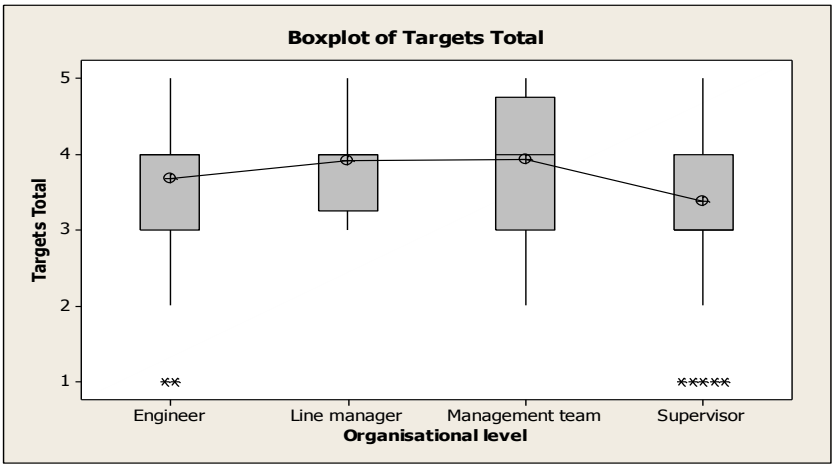


FIGURE 18. Boxplots of targets total per organizational level.

The main effects plot, presented in figure 19 underlines the effect of the organizational level. Supervisors have clearly the lowest scores and also others are above the mean line. Management team is having highest scores in this graphical analyses.

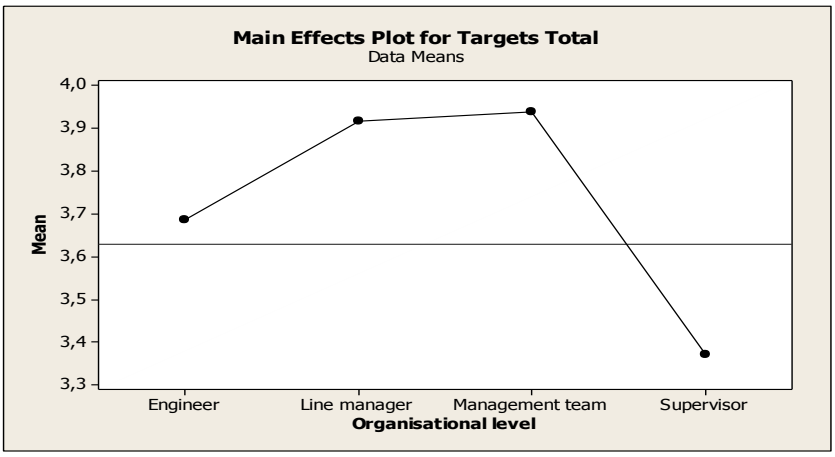


FIGURE 19. Main effects plot of targets total per organization level.

Figure 20 presents the answers for the targets related questions divided by the type of department. Maintenance is having the best results and others and production are following.

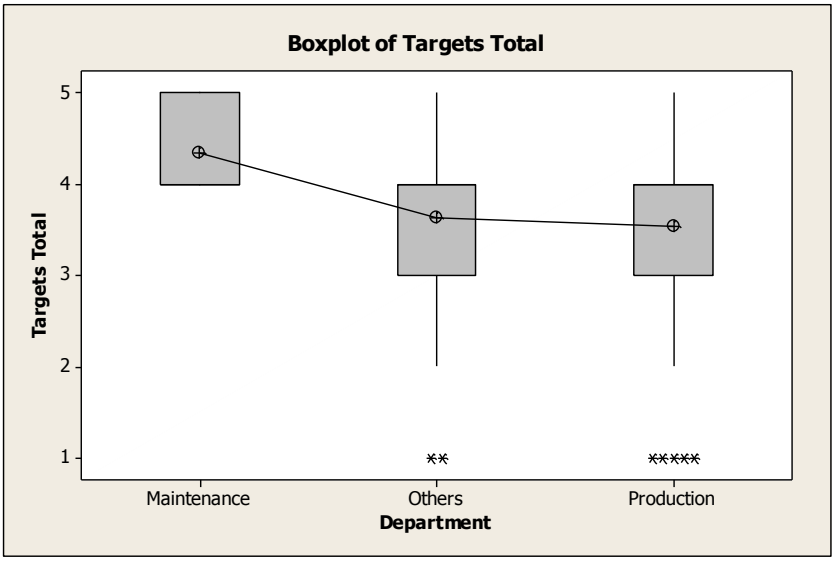


FIGURE 20. Boxplots of targets total per type of department.

From the main effects plot in figure 21 it is easy to see the big difference between the different types of department. Maintenance is jumping up with the very high scores and production is clearly below the mean line.

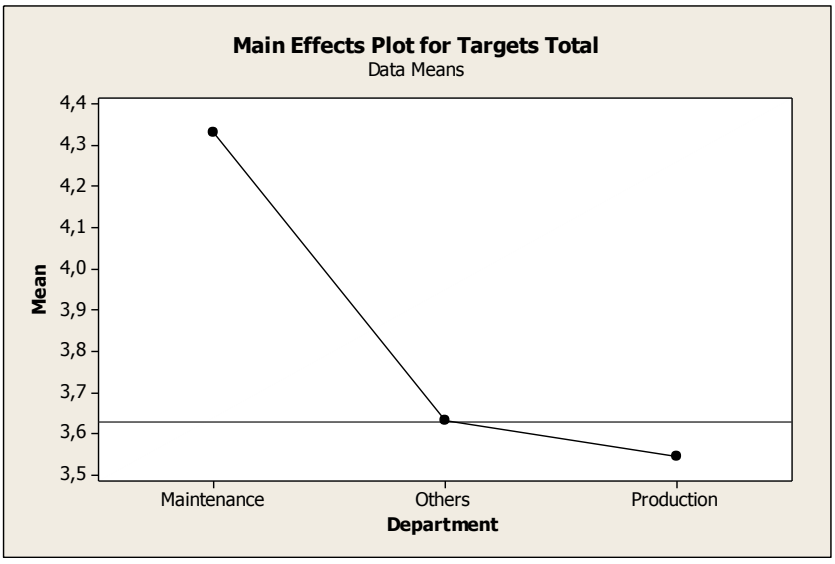


FIGURE 21. Main effects plot of targets total per type of department.

Indicators:

Figure 22 presents the graphical summary of all answers related to indicators. Overall level of answers is quite high and level 4 "good" have the biggest amount of answers. Mean of the all strategy related answers is 3,6968. Distribution of the answers is following the normal distribution.

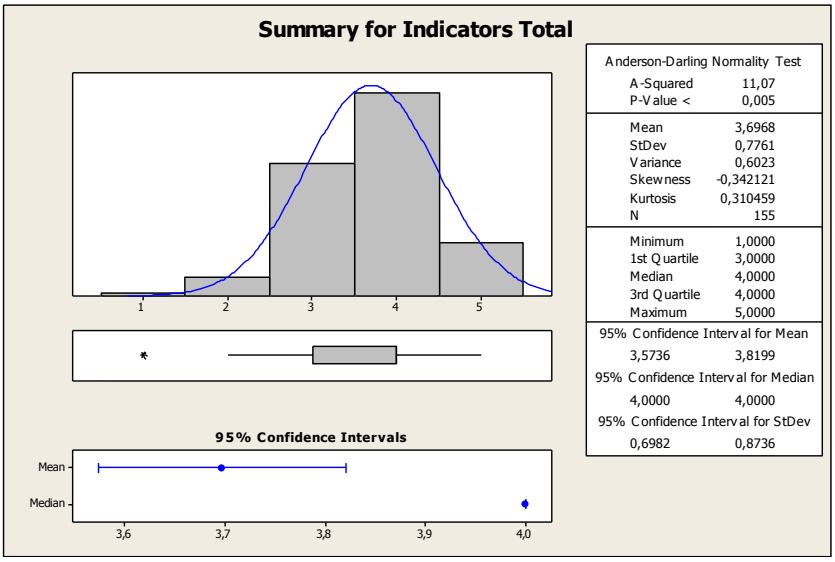


FIGURE 22. Graphical summary of indicators total.

In indicators the effect of the organizational level is not that big as in strategy and targets. Mill management team scores are still highest and supervisors scores are lowest. Figure 23 presents the boxplots of the indicators related answers divided by the organization level.

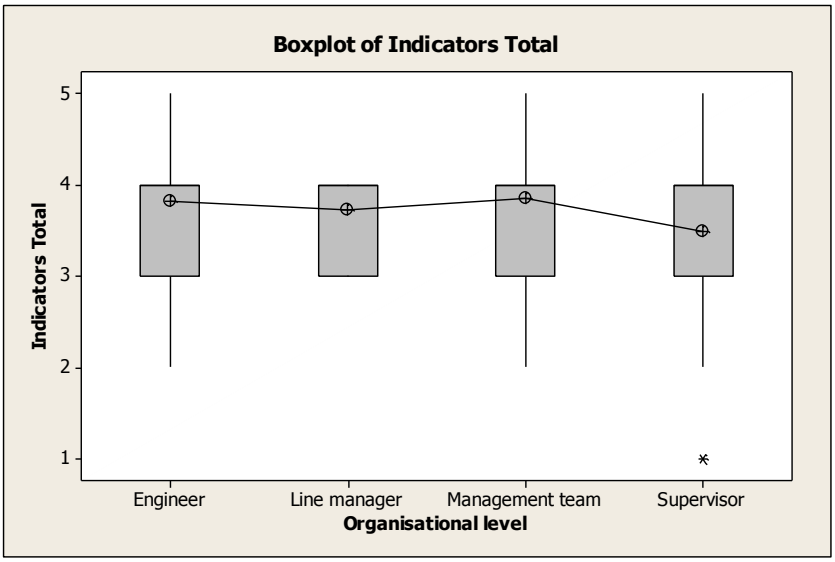


FIGURE 23. Boxplots of indicators total per organizational level.

The main effects plot, presented in figure 24 shows the effect of the organizational level. Supervisors have the lowest scores and is the only level where the scores are below the mean line. Management team is having highest scores in this graphical analyses.

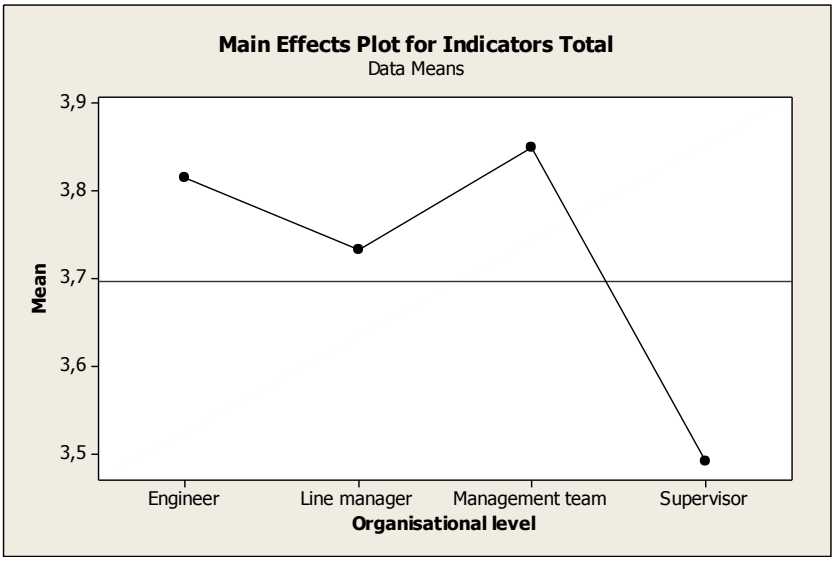


FIGURE 24. Main effects plot of indicators total per organization level.

Figure 25 presents the answers for the indicators related questions divided by the type of department. Maintenance is having the best results and others and production are following.

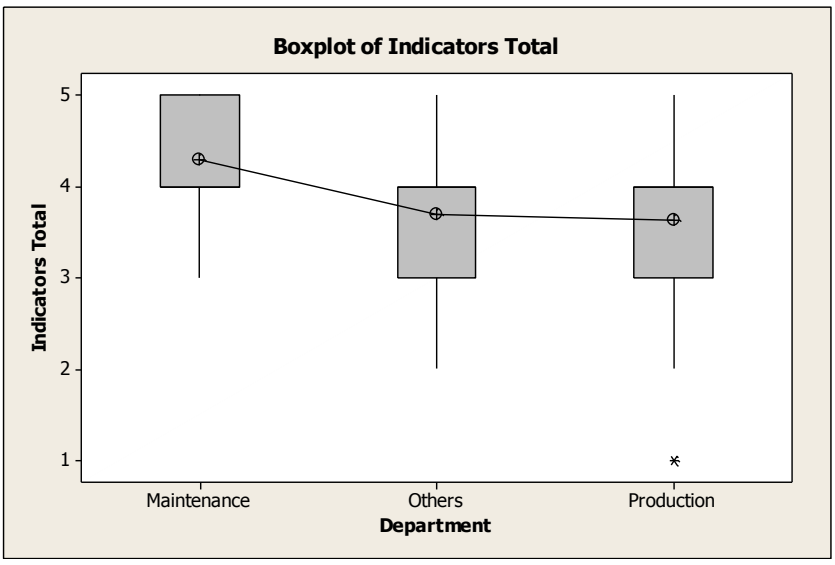


FIGURE 25. Boxplots of indicators total per type of department.

From the main effects plot in figure 26 it is easy to see the big difference between the different types of department. Maintenance ended up with the very high scores and production is below the mean line.

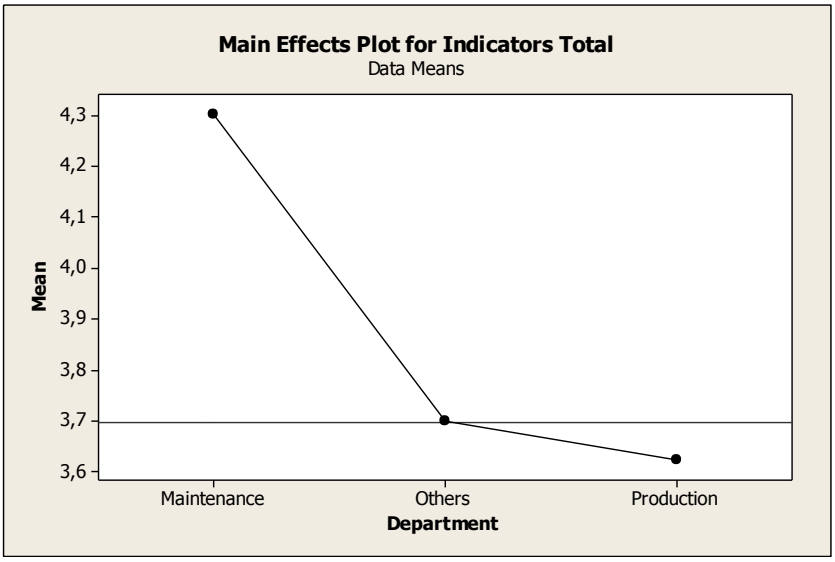


FIGURE 26. Main effects plot of indicators total per type of department.

Corrective actions when targets not met:

Figure 27 presents the graphical summary of all answers related to actions. Overall level of answers is quite high and level 4 “good” have the biggest amount of answers. Mean of the all strategy related answers is 3,5699. Distribution of the answers is following the normal distribution

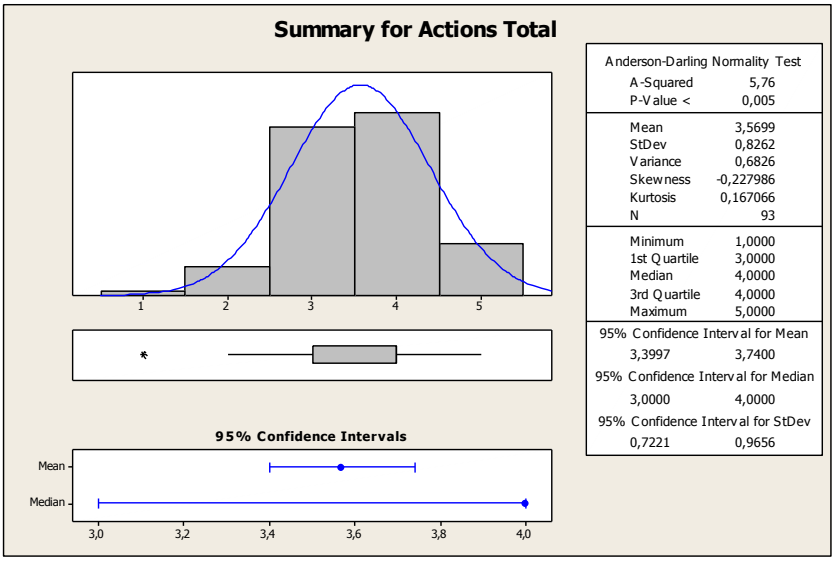


FIGURE 27. Graphical summary of actions total.

In actions the effect of the organizational level is clear. Mill management team scores are highest and supervisors scores are lowest. Figure 28 presents the boxplots of the actions related answers divided by the organization level.

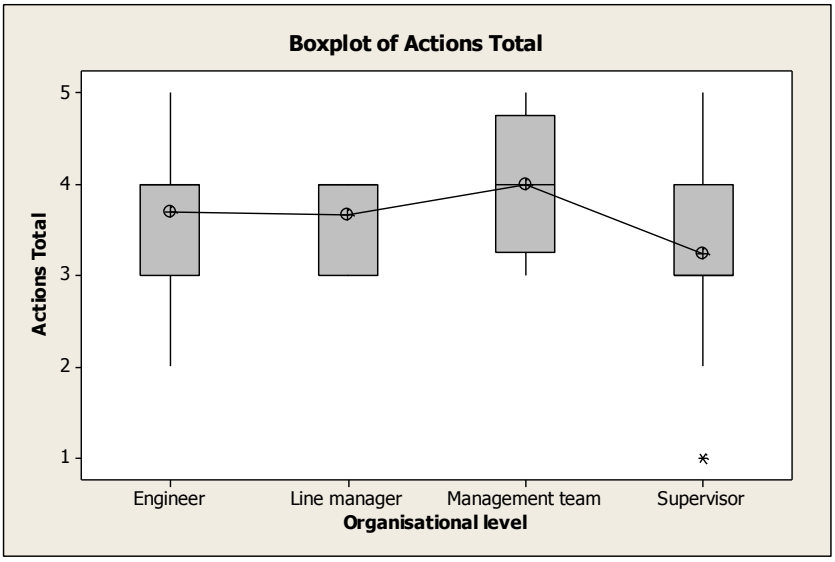


FIGURE 28. Boxplots of actions total per organization level.

The main effects plot, presented in figure 29 shows the effect of the organizational level. Supervisors have the lowest scores and is the only level where the scores are below the mean line. Management team is having highest scores in this graphical analyses.

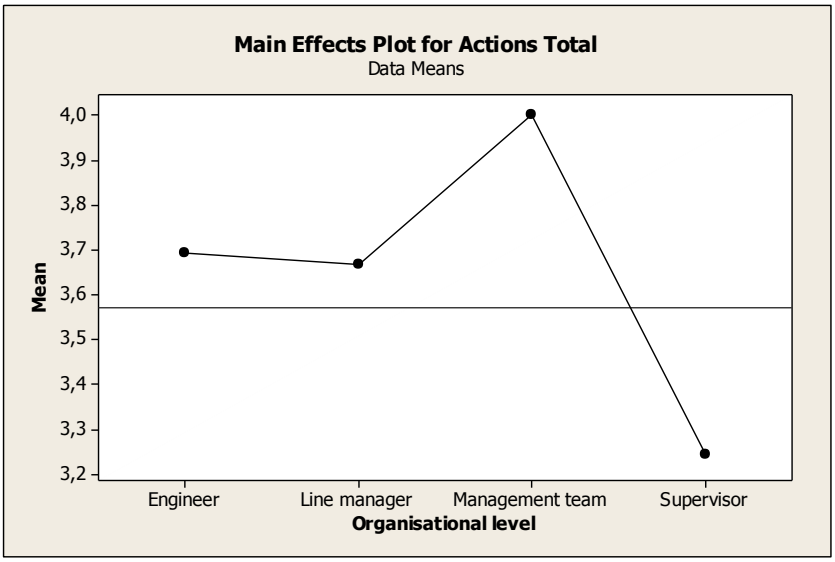


FIGURE 29. Main effects plot of actions total per organization level.

Figure 30 presents the answers for the actions related questions divided by the type of department. Others is having the best results and maintenace and production are following.

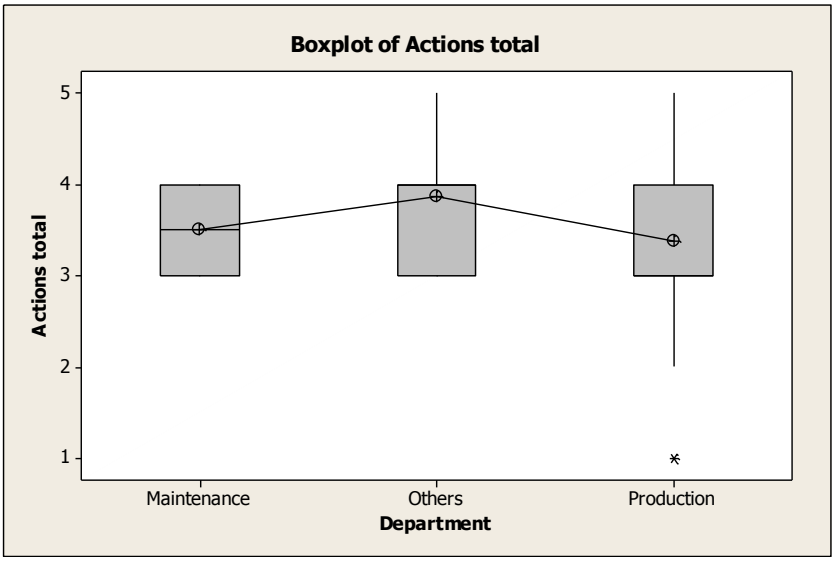


FIGURE 30. Boxplots of actions total per type of department.

From the main effects plot in figure 31 it is easy to see the big difference between the different types of department. Others are having the very high scores and production and maintenance are below the mean line.

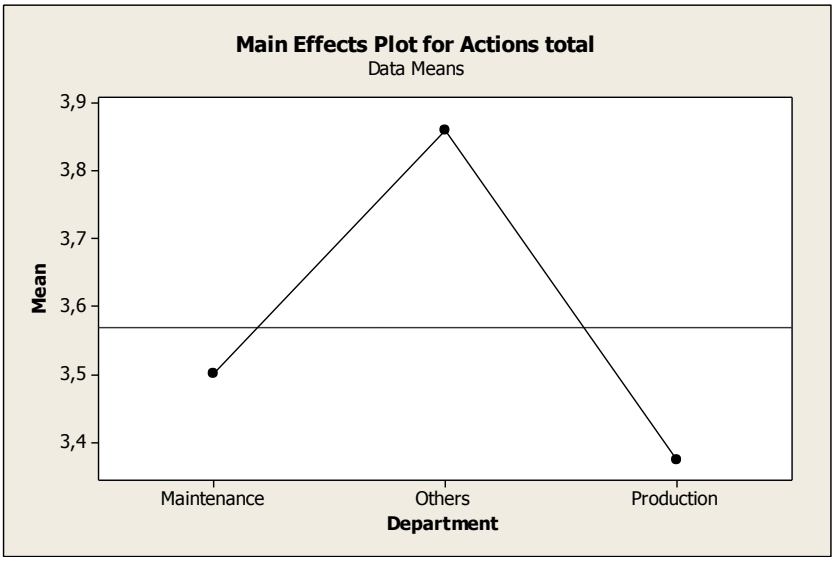


FIGURE 31. Main effects plot of actions total per type of department.

Team board meetings:

Figure 32 presents the graphical summary of all answers related to team board meetings. Overall level of answers is quite high and level 4 "good" have the biggest amount of answers. Mean of the all strategy related answers is 3,6595. Distribution of the answers is following the normal distribution.

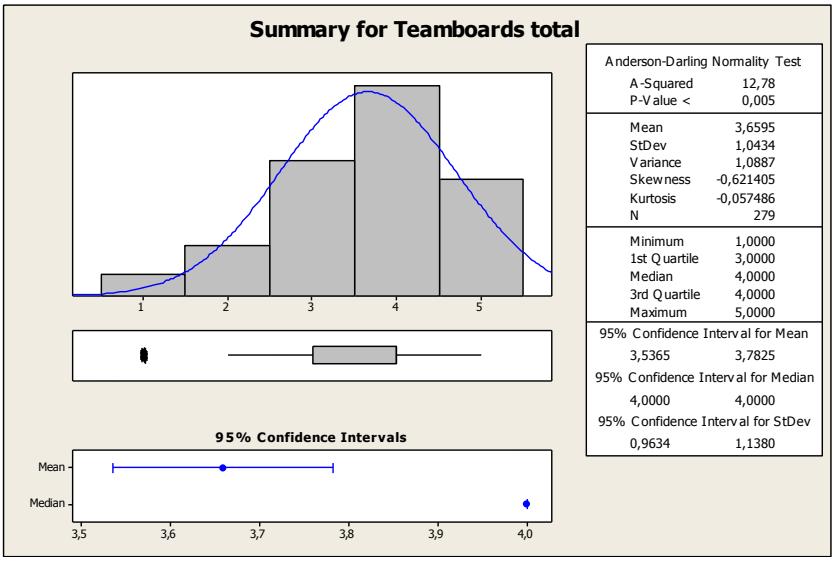


FIGURE 32. Graphical summary of team board meetings total.

In team board meetings the effect of the organizational level is significant. Line managers and management team scores very high and supervisors scores are lowest. Inside the group supervisors there is big differences how supervisors are seeing the team board meetings. Figure 33 presents the boxplots of the team board meetings related answers divided by the organization level.

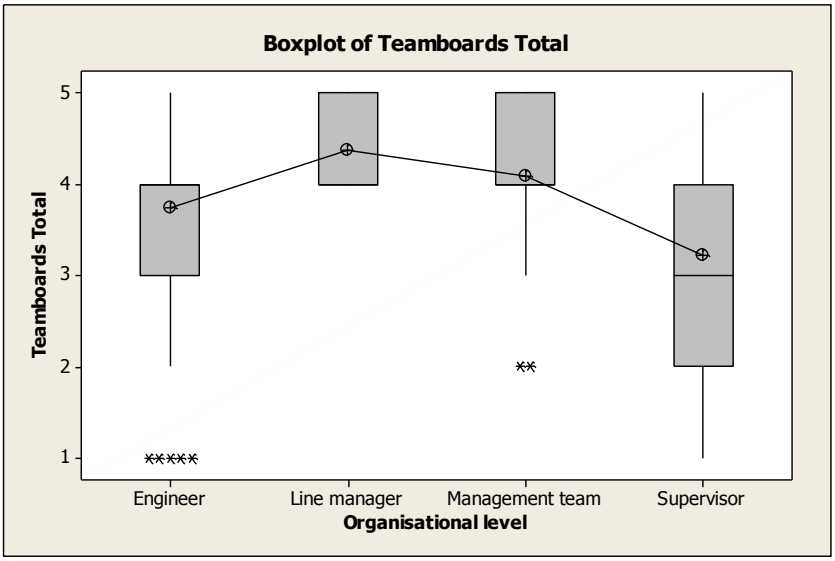


FIGURE 33. Boxplots of team board meetings total per organizational level.

The main effects plot, presented in figure 34 shows the effect of the organizational level. Supervisors have the lowest scores and is the only level where the scores are below the mean line. Line managers is having highest scores in this graphical analyses.

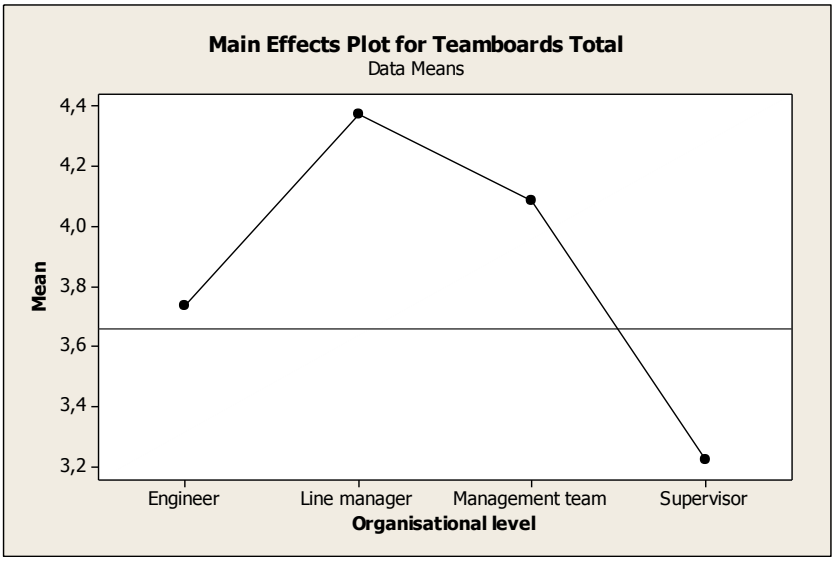


FIGURE 34. Main effects plot of team board meetings total per organizational level.

Figure 35 presents the answers for the team board meeting related questions divided by the type of department. Maintenance is having the best results and others and production are following.

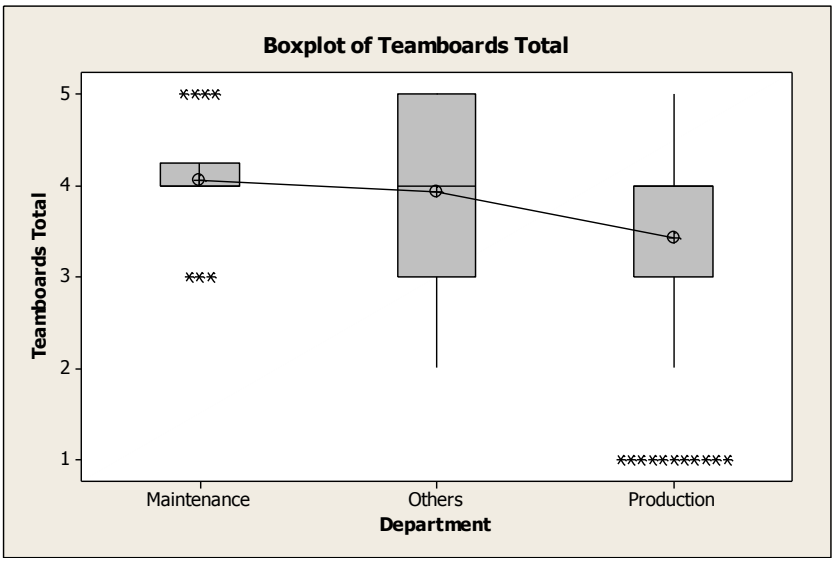


FIGURE 35. Boxplots of team board meetings total per type of department.

From the main effects plot in figure 36 it is easy to see the big difference between the different types of department. Maintenance and others are having the high scores and production is below the mean line.

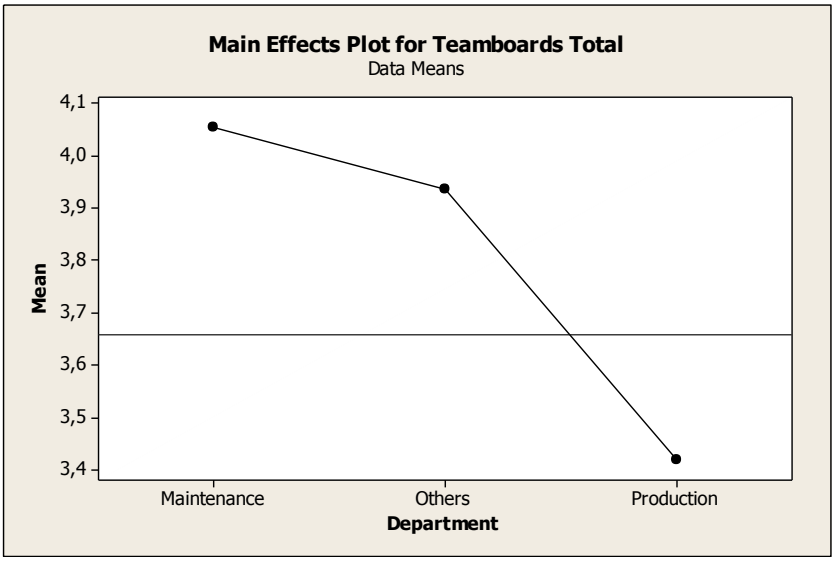


FIGURE 36. Main effects plot of team board meetings total per type of department.

4.1.3 Analysis

This chapter stands for the analyzing of the results from the structured survey about the hoshin kanri elements in Kirkniemi mill. Conclusions and proposals for the future improvements can be found from the chapter 5 in this thesis.

Survey total:

Taken into account that this survey was done during first year of the hoshin kanri in Kirkniemi, the overall scores for the survey were high. Interesting and not that surprising finding for me was that the effect of the organizational level was significant. Higher levels of the organization gets the highest scores out of the survey. Departmental variances were also pretty high, maintenance departments were having the highest scores and others and production were following.

Strategy:

Also in strategy related questions the overall scores were in the high level. Effect of the organizational level was big, higher you go inside the organization, higher scores you get. In the comparison to mean line, engineer-,and supervisor levels were below the line. Inspection about the effect of the type of departments shows that the maintenance departments are having the highest scores and others and production are following. Production departments are below the mean line.

Targets:

In strategy related questions the answers were pretty much following the answers of the strategy related questions. Overall scores were in the high level. Effect of the organizational level was big, higher you go inside the organization, higher scores you get. Supervisor level was clearly below other organization levels. Maintenance departments had the highest scores and others and production were following. Production departments were again below the mean line.

Indicators:

For the questions related to indicators the overall level was high. Effect of the organization level was not significant and in comparison to other elements it was even small. Still the supervisor level had clearly the lowest scores in these questions. In inspection about the effect of the type of department maintenance departments had the highest scores and others and production were following. Production departments were below the mean line.

Corrective actions:

Overall level was high/moderate. Effect of the organization level differs from other elements: Management team had the highest scores, but the engineer level got the second best results before the line managers and supervisors. The effect of the type of department was not big, the others had the highest scores.

Team boards:

Overall scores were high. In the effect of the organizational level this element was the only one where line managers (or any other level than management team) got the highest scores. Supervisors had again the lowest scores. There was effect of the type of the department, but that effect was not that big. Maintenance got the highest scores and others and production were following.

4.2. Observation research: Team board meetings at the departments

Second approach for the scientific problem was the observation research.
Target of this research was to see how people and organizations are really managing their departmental performance management (CAPD- cycle) at the team boards in their normal working environment. Observed teams were consist of people from different organizational levels including operators which were not participating the structured survey explained in previous chapter 4.1.

The data for this research was collected from the monthly Go to Gemba reports done by management team members, so the observation team was :

- Mill Director
- Production Manager
- Technics Manager
- HR Manager
- Process and quality Manager
- Safety Manager
- Mill Controller
- CI-Expert (author of this thesis)

Evaluated elements of the hoshin kanri in this part were:

- Hoshin sheets
- Visualization of the KPI's
- Actions out from the target deviations
- Action lists and action follow-up
- Hoshin kanri related project management
- Idea process

Observations were divided in three categories:

Colour	Level	Numerical
Green	Good	3
Yellow	Moderate	2
Red	Not ok	1

FIGURE 37. Categories in the Observation survey

4.2.1 Execution

I collected totally 51 observations from the 6 months period from October 2013 (beginning of the hoshin kanri in Kirkniemi) to March 2014.

Departments were divided to the 5 groups as:

- Paper production
- Pulp production
- Energy production
- Maintenance
- Others

I used this dividing to see difference between the departments and still having the big picture at the same time in aim to understand the current status and use it as a basis for the future improvements.

4.2.2 Results

In this chapter the results out of the observation research is shown in three different graphs per element.

Firstly I present the graphical summary of the selected element to show how the level of element in every departments.

Secondly time series shows the development of the element over time. Here you can be found how the level of the every element has developed in six month period from October 2013 (first points in graphs) to March 2014 (last points in graphs).

Third way to show the results is the boxplot evaluation by element and the department. This shows how different departments were succeeding per element.

Hoshin sheets:

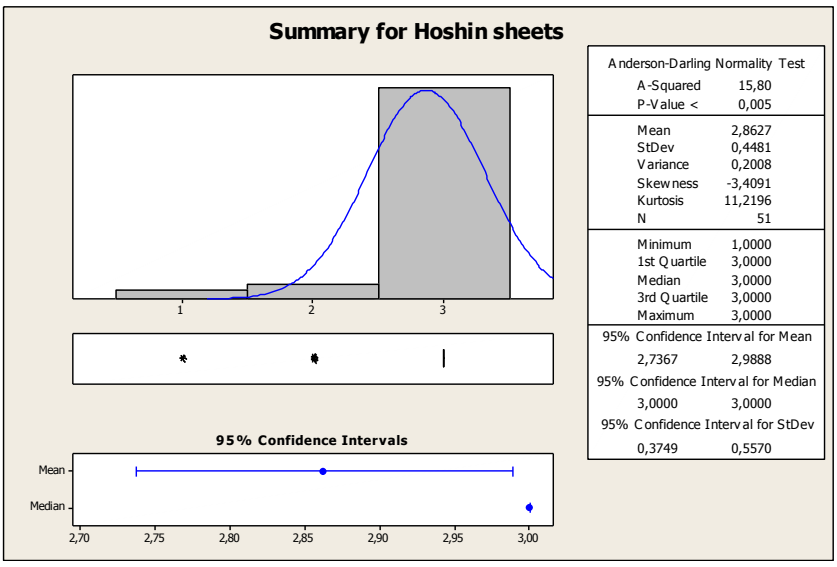


FIGURE 38. Graphical summary of the hoshin sheets.

In the graphical summary of the hoshin sheets can be found that general level of the element is high. Level 3 (Good) has clearly the biggest bar and smaller levels have only some points.

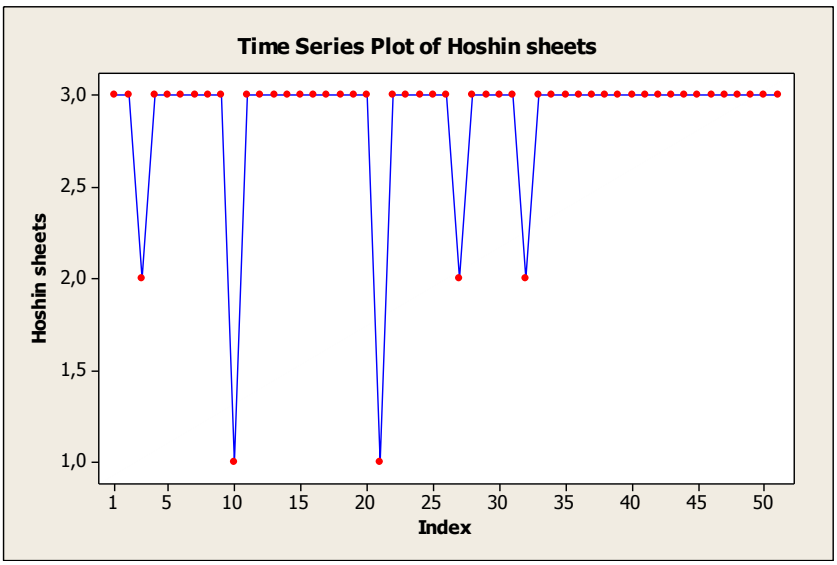


FIGURE 39. Time series plot of the hoshin sheets.

Figure 39 shows that there has been development in the levels of this element hoshin sheets. Last observation which was not in the level 3 was number 32 observed January 2014.

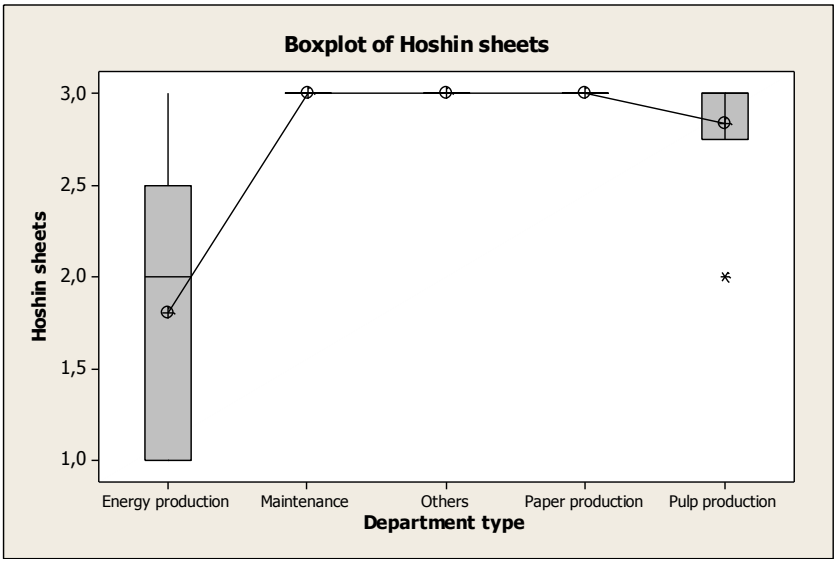


FIGURE 40. Boxplot of the hoshin sheets.

From the boxplot it is easy to see the difference between the different departments. All departments excluding Energy production are having good results.

KPI visualization:

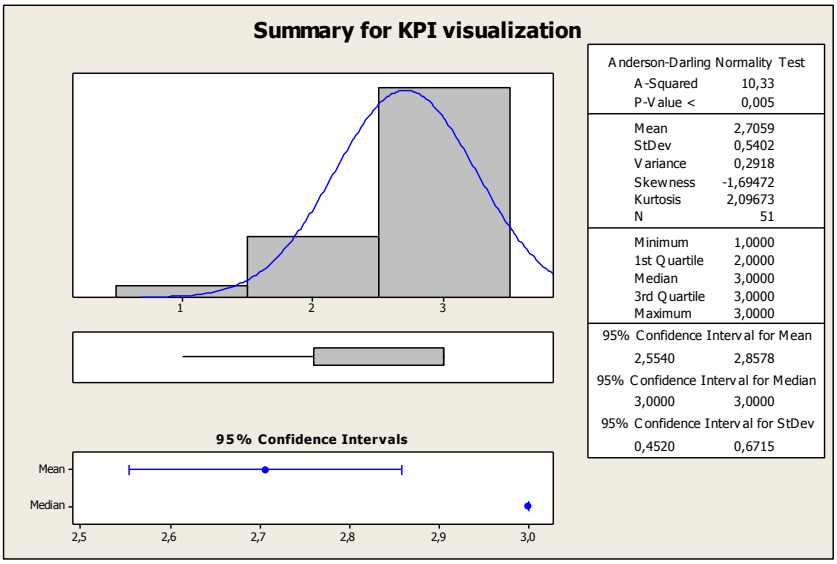


FIGURE 41. Graphical summary of the KPI visualization.

In graphical summary of the hoshin sheets can be found that general level of the element is high. Level 3 (Good) has clearly the biggest bar but also level 2 is having points.

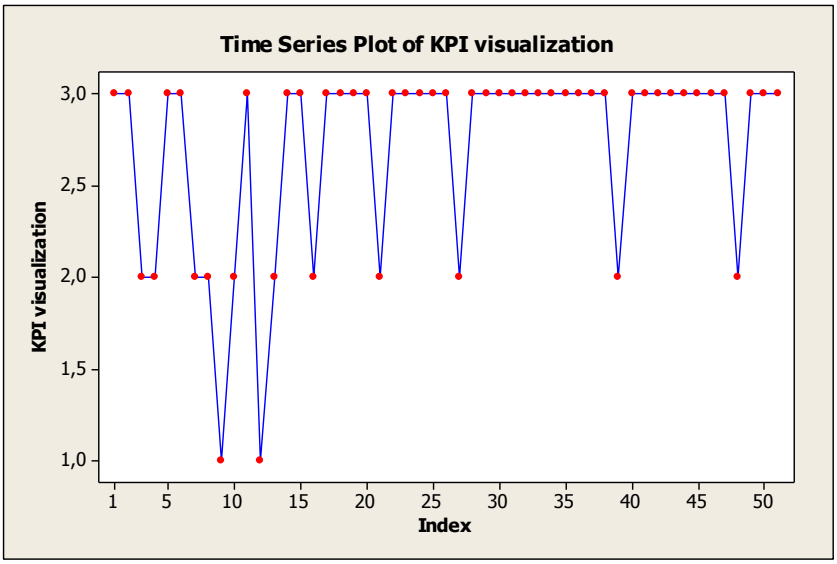


FIGURE 42. Time series plot of the KPI Visualization.

Figure 42 shows that there has been development in the level of this element. There has not been level 1 observations after point number12 observed 15.12.2013.

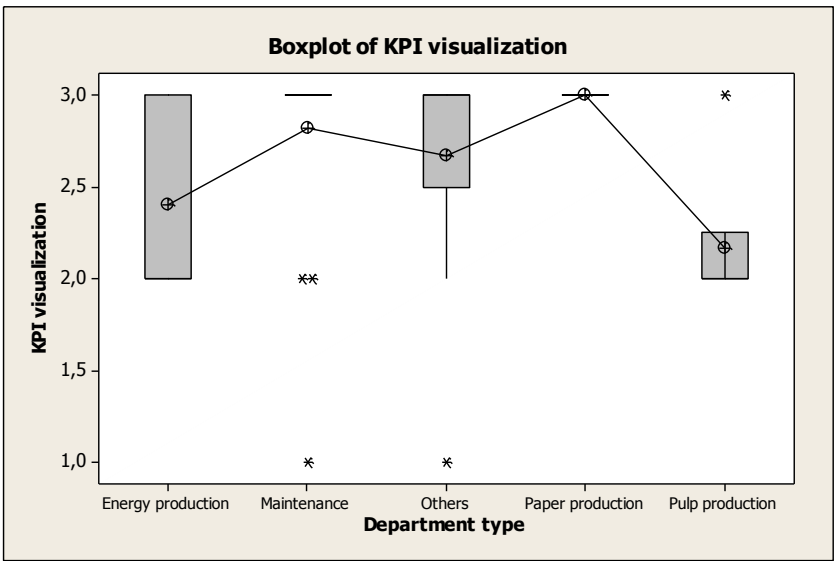


FIGURE 43. Boxplot of the KPI visualization

From the boxplot it is easy to see that there are some difference between the departments. Variation in maintenance is significant. Paper production is having only level 3 observations.

Corrective actions out of the target deviations:

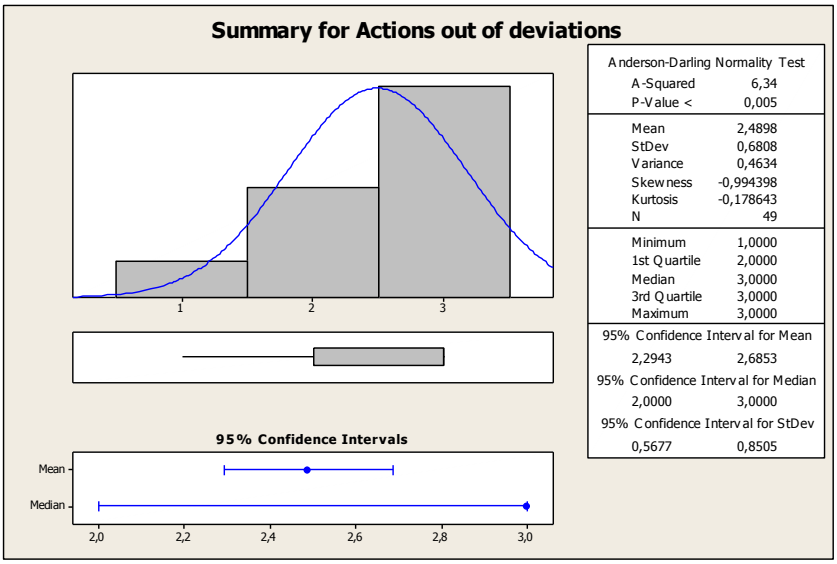


FIGURE 44. Graphical summary of the corrective actions.

In graphical summary of the corrective actions can be found that general level of the element is still high. Comparing the previous elements the general level is not that high anymore.

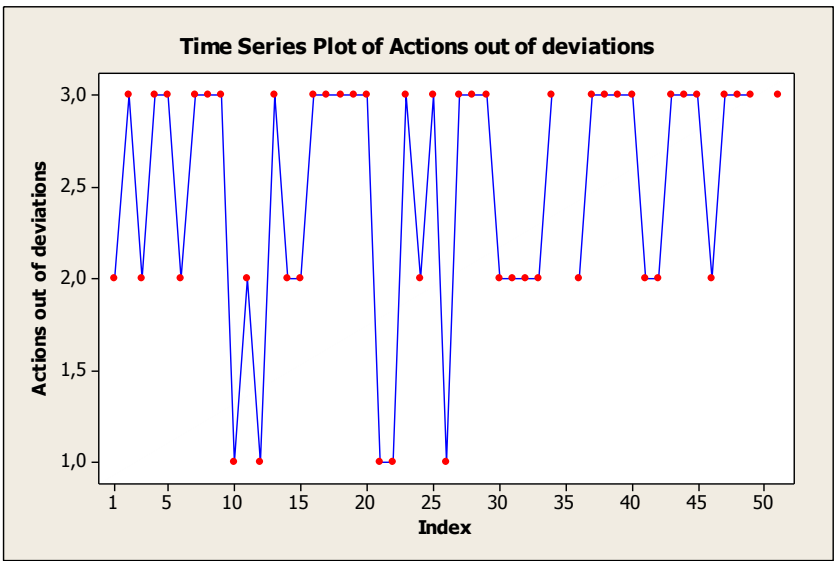


FIGURE 45. Time series plot of the KPI Visualization.

Figure 45 shows that there has been development in the levels of this element. There has not been level 1 observations after point number 26 observed 22.1.2014.

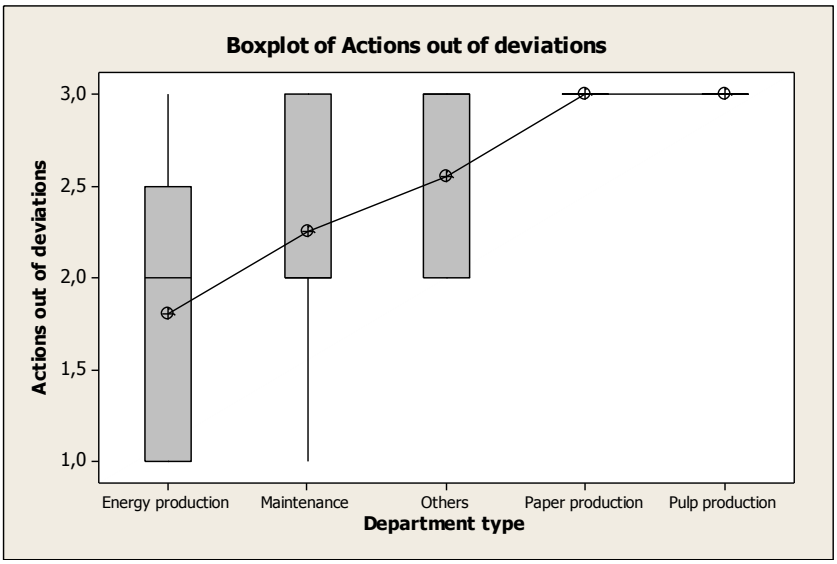


FIGURE 46. Boxplot of the corrective actions.

From the boxplot it is easy to see that there are difference between the departments. Variation in maintenance is significant. Paper production and Pulp production are having only level 3 observations. Energy production is in a low level.

Action lists and actions follow-up:

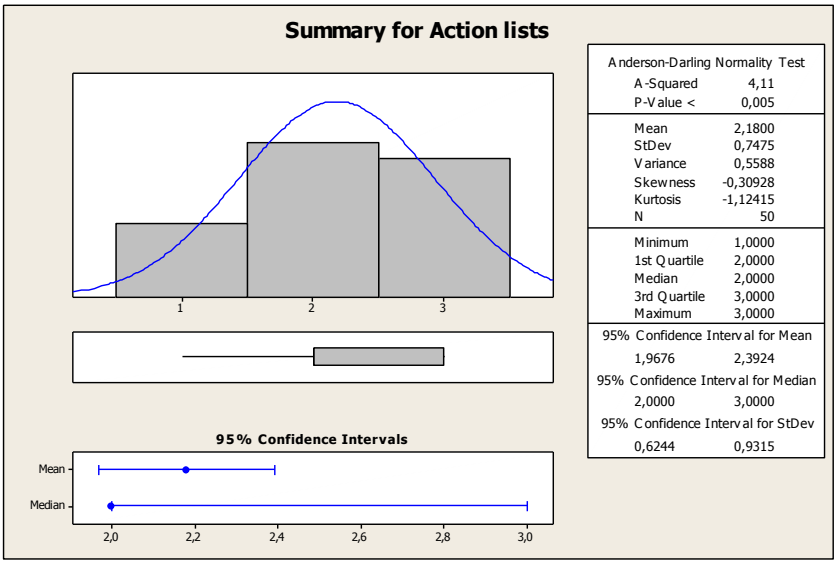


FIGURE 47. Graphical summary of the action lists.

In graphical summary of the corrective actions can be found that general level of the element is moderate. Level 2 is having the highest amount of the observations.

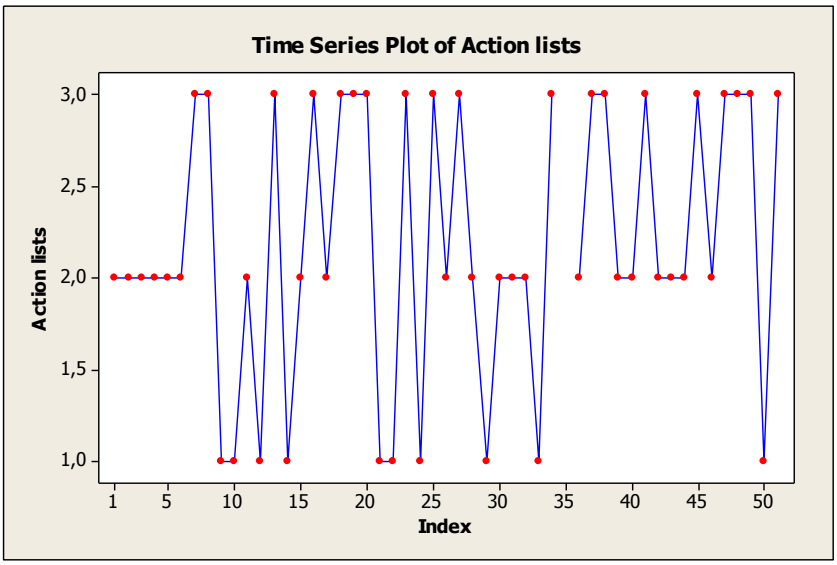


FIGURE 48. Time series plot of the action lists.

Figure 48 shows that there has not been significant development in the levels of this element.

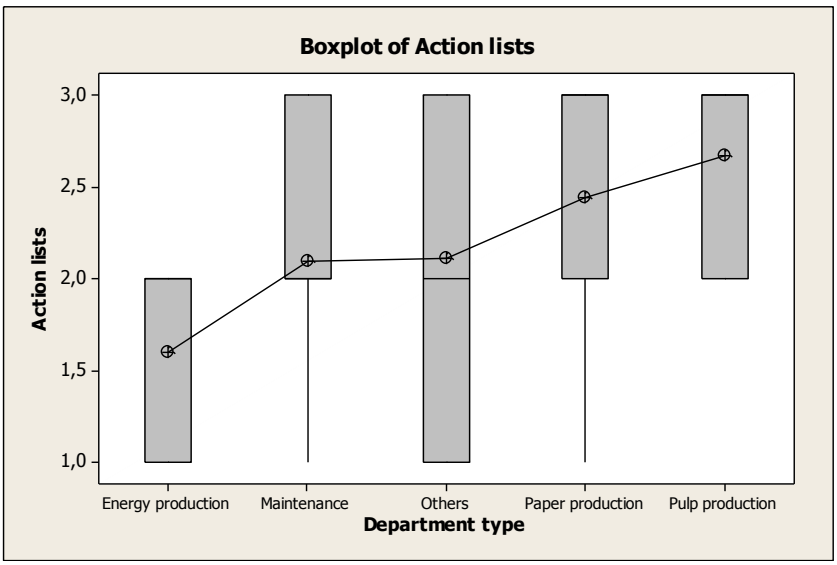


FIGURE 49. Boxplot of the action lists.

From the boxplot it is easy to see that there are difference between the departments. Variation in others is significant. Paper production and Pulp production are in high level. Energy production is in a low level.

Project work:

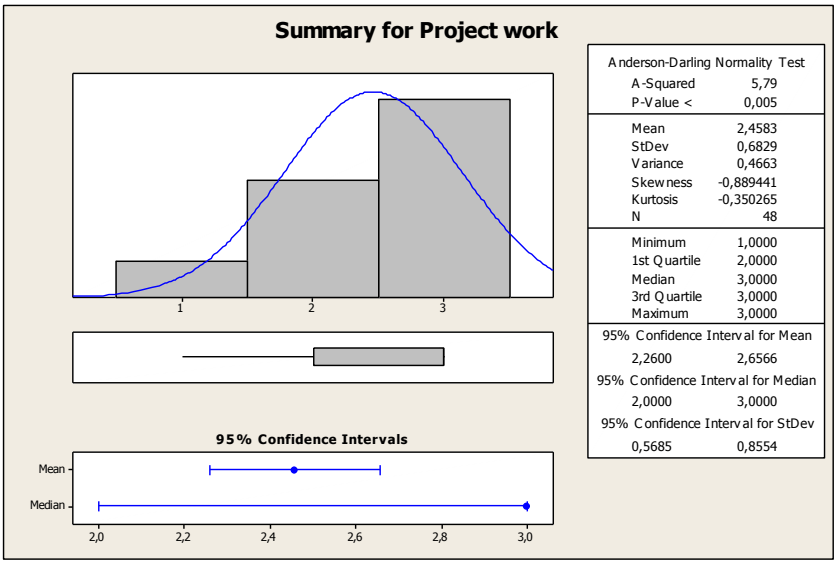


FIGURE 50. Graphical summary of project work.

In graphical summary of the project work can be found that general level of the element is high. Level 3 is having the highest amount of the observations.

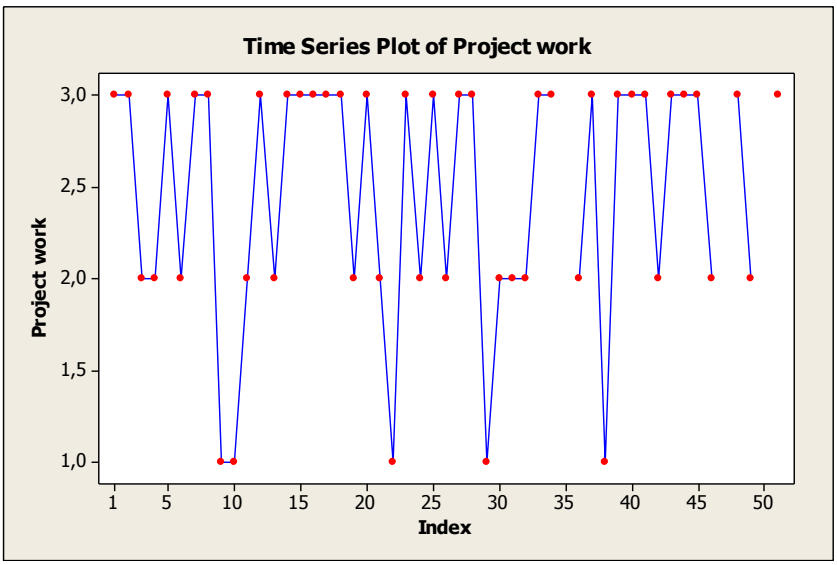


FIGURE 51. Time series plot of the project work.

Figure 51 shows that there has been some development in the levels of this element.

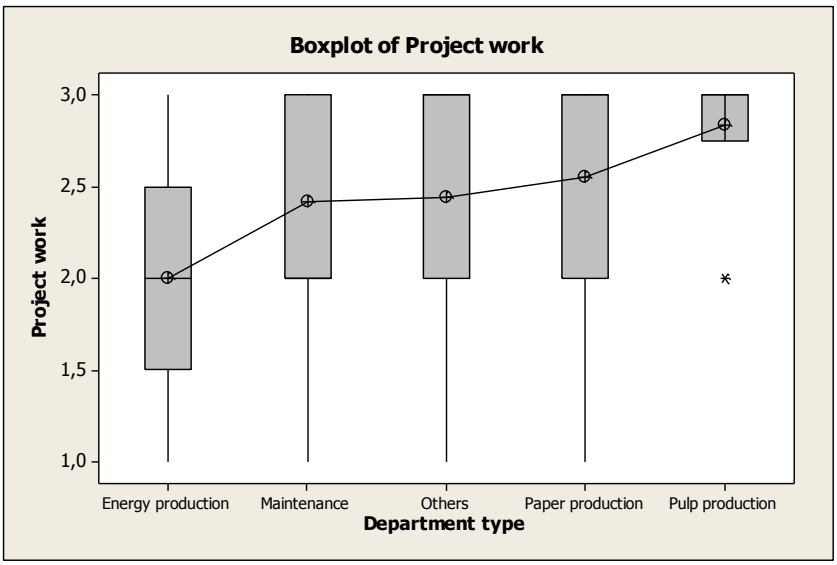


FIGURE 52. Boxplot of the project work.

From the boxplot it is easy to see that there are difference between the departments. Variation in Energy production is significant. Pulp production is in highest level. Energy production is in a lowest level.

Idea process:

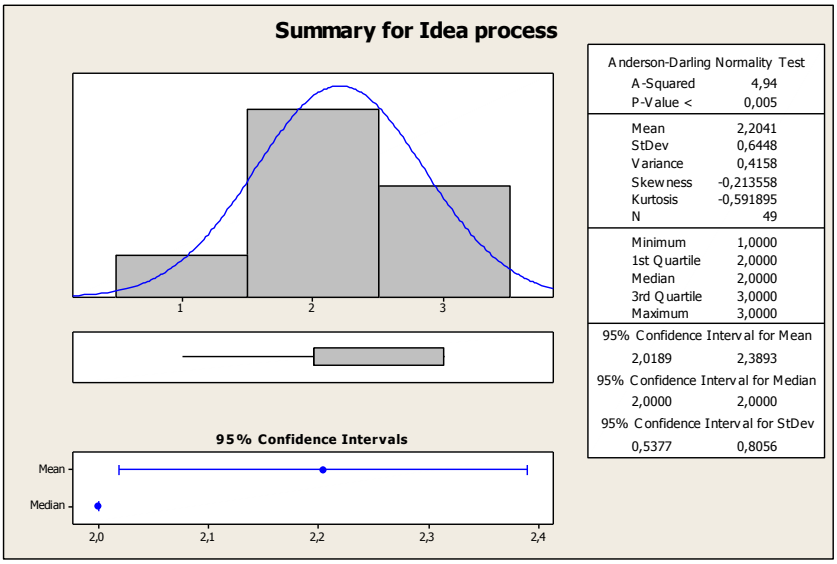


FIGURE 53. Graphical summary of idea process.

In graphical summary of the idea process can be found that general level of the element is moderate. Level 3 is having the highest amount of the observations.

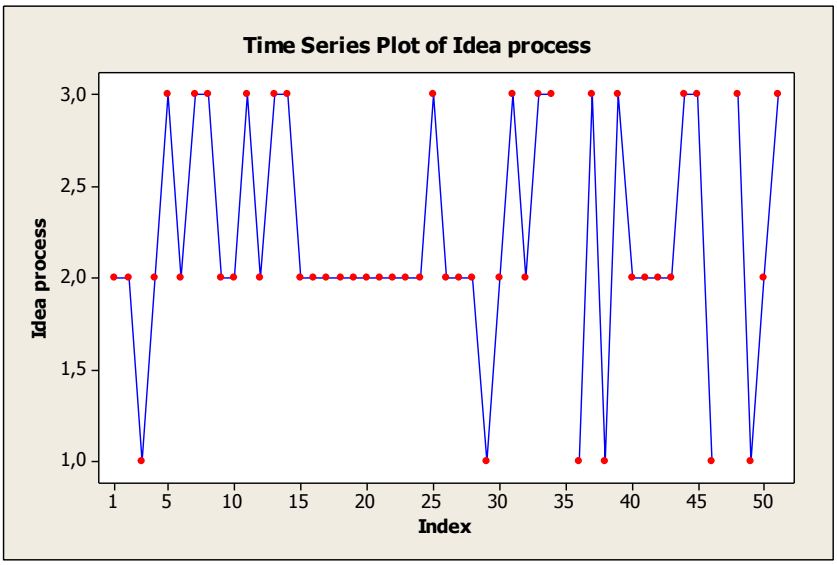


FIGURE 54. Time series plot of the idea process.

Figure 54 shows that there has not been development in the levels of this element.

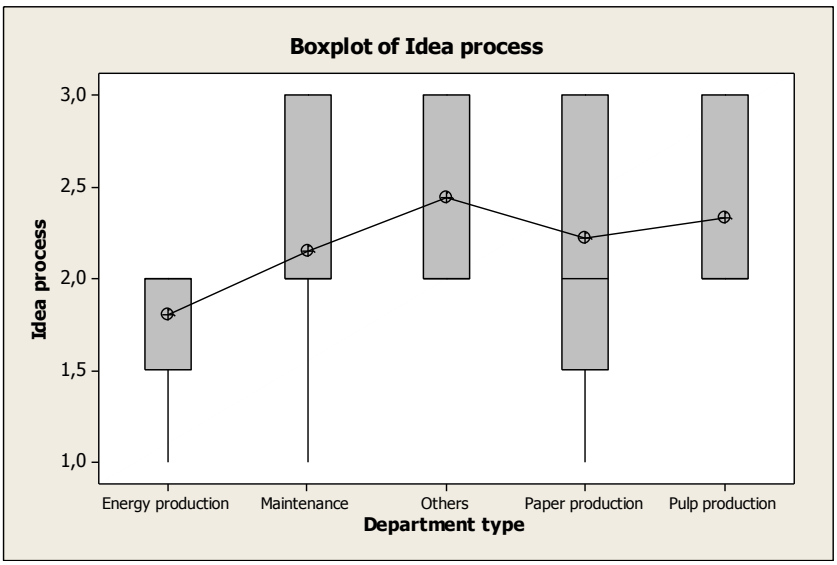


FIGURE 55. Boxplot of the idea process.

Variation in Maintenance and Paper production is significant. Energy production is in a lowest level.

4.2.3 Analysis

Hoshin sheets:

Overall level of the hoshin sheets was very high. There was development over time. Maintenance, paper production and others had only level 3 scores. Energy production had lowest scores with the big variation of scores.

Visualization of the KPI's:

Overall level was high. There was development over time. Paper production had only level 3 scores, Pulp production had the lowest scores.

Actions out from the target deviations:

Overall level was high. There was development over time. Paper roduction and Pulp production had only level 3 scores. Energy production had again the lowest scores with significant variation.

Action lists and action follow-up:

Overall level of this element was moderate. There was not big development over time. Pulp production had the highest scores and Energy production lowest. Variations were big in all departments.

Hoshin kanri related project management:

Overall level was high. There was some but not that big development in this element. Pulp production had the highest scores and Energy production lowest. All departments excluding Pulp production had big variation in their scores.

Idea process:

Overall level was moderate. There was not development over time. Others had the highest scores and Energy production lowest.

5 SUMMARY AND CONCLUSIONS

The process of making this thesis was very interesting and I really learnt a lot of many different things. In my normal working life I work very closely with the items dealt this thesis, still it was opening my eyes to really dig into the theory and practice of the way to play with the strategies. In this chapter I am concluding the results of this thesis and give some proposals and ideas how to improve our hoshin kanri process at the mill further. I think that the every company has to find the own way to make hoshin kanri alive, but at least for me it was important to learn from others as well and I really hope that these results can help you reader to avoid some pitfalls and confirm your ideas about the important elements in your way to hoshin kanri.

In this chapter I am presenting the findings and improvement ideas in the chronological order as these things happened to me between June 2013 and April 2014.

First contact between me and hoshin kanri happened when Sappi Fine Paper Europe launched a program and I travelled to Germany to visit the company called Fischer. This company had many years of experience and lots of expertise about the hoshin kanri. This visit was very important and helped us a lot to understand what hoshin kanri is and how to work with it. So in my opinion, it is very helpful and make sense to visit somebody who already have worked with the hoshin kanri in the beginning of the implementation process.

The next part of the process was the hoshin sheet creation for the business year 2014. We had two consultants from Fischer to help us to make the sheets first time. We used first two days to make the sheets for the management team and then we had a one day workshop with the line managers where we started the vertical and horizontal alignment of the targets. Also here the external help was important and I suggest to have some help in this stage. This process where the targets are set and aligned is called catch-ball. Many references are telling about the importance of the catch-ball and I agree with those.

In the first year in Kirkniemi we had real catch-ball only with management team and line managers. Results of this thesis shows that the organizational levels that played catch-ball are having the highest scores in most of the elements evaluated.

Extension of the catch-ball and concentration also lower levels of the organization is something that I really recommend.

After the creation of the first sheets I started to dig into theory and literature about the hoshin kanri. I found many good books and I realized that these books and articles also helped me to understand what is this all about. So, I recommend to take a look of the literature. Some good ones can be found in the reference list of this thesis.

Next part for me was the structured survey of the hoshin kanri elements. I created the survey together with our mill communications and there I realized that even if the hoshin kanri is simple and easy to understand tool, it is not that easy to create questions about it in the way that every participant can understand the questions in the same way. Results of this survey were first really concrete result out of all work done so far. The main findings from the structured survey:

- The overall level was high, this was surprising me a bit because we did hoshin kanri first time and the time schedule was tight so I did not assume that high scores.
- The effect of the organizational level was significant. High levels got high scores. I think that this is coming mainly from the communication and catch-ball. We took higher levels inside the process more than lower levels.
- The effect of the department type was considerable. Maintenance department was in higher level than others and production. Production is working mainly in shifts and communication is much more challenging in shift work. I believe that this is one of the main causes of the low scores.

The proposal for the future based on structured survey:

- Involve more lower levels and especially supervisor level to the hoshin kanri process.

After the structured survey I thought that something else needs to be done to get credible picture about the status of the hoshin kanri elements in the mill. I decided to continue with the observation research where all the management team members were observing the departmental team board meetings and reported the findings. This method was already in use and it helped me a lot because the data was already collected and my job was to analyze it.
Main findings from the Observation research:

- Overall level was high even if the first data's has been collected just after the hoshin kanri implementation.
- Paper- and Pulp production areas had the high scores in this research. This was interesting because in the structured survey the production had lowest scores.
- Energy production had the lowest scores.
- Most of the elements, but not all have developed over time.

The proposals for the future based on observation research:

- Deeper analysis (interviewing) about the root causes in the energy production and corrective actions of this analysis.
- Mill level analysis out of the elements which has not developed over time (Action lists, Project work and Idea process).

Results from the research methods confirmed my feelings about the fact that we have been able to take manager level with us (management team) in implementation of the strategy, but our challenge in future is to continue this deployment to lower levels in our organization.

In ideal world every operator (employee) in the mill is working all the time towards the strategic targets and support the whole mill by his/her actions. To reach this situation, also the role and skills of the front line supervisors has to change. This will be one part of the training program for the supervisors starting with external training company during this year.

This thesis is not covering all the parts of the hoshin kanri and couple of questions left open and/or I have the feeling that these points are worth to investigate further. This questions are:

- How to support hoshin kanri targets with the salary systems/bonuses/annual performance reviews?
- How to involve and measure the lowest organization level (operators) in the production and maintenance?
- What amount of the total workload should be inside the annual hoshin sheet?

All in all I see positive development in the understanding and implementation of the strategy in Kirkniemi and I am sure that we are able to perform better in future with the increased knowledge of the hoshin kanri.

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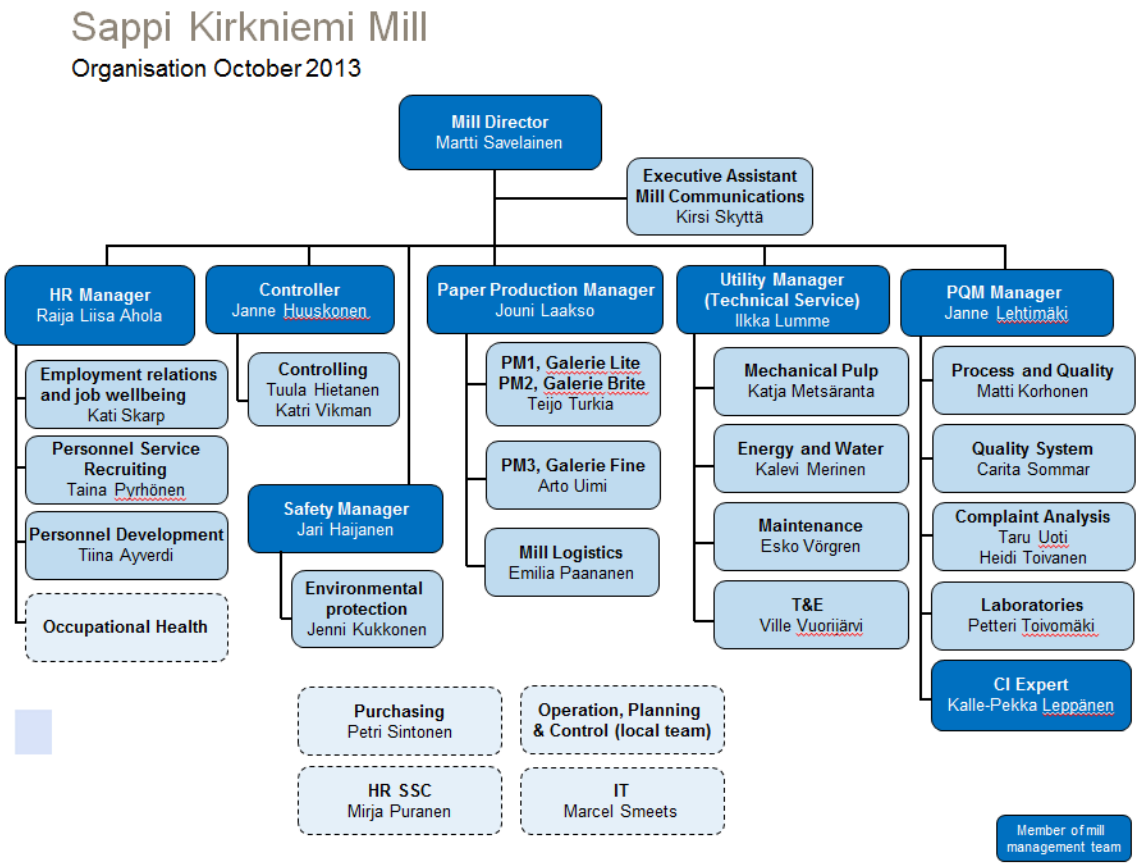
APPENDICES

Appendix 1. Kirkniemi Mill organization chart



Appendix 2. Structured survey: Elements of the hoshin kanri

Strategy:

Question1: What is the overall quality of the SFPE strategy in your opinion?

Question2: How clear and understandable is SFPE strategy in your opinion?

Question3: How much you can influence in the SFPE strategy execution?

Question4: How much your direct reports can influence in the SFPE strategy execution?

Main targets:

Question5: What is the quality of the mill level target deployment to your organization in your opinion (Top -> Down, vertical alignment)?

Question6: What is the quality of the horizontal alignment in your opinion (departments don't have contradictory targets)?

Question7: What is the quality of the target selection in your opinion (Most important points are selected to be main targets)?

Question8: How well the mill level main targets are fulfilling S.M.A.R.T definition in your opinion (Specific, Measurable, Achievable, Relevant to business, Time based)?

Question9: What is the quality of the timing in intervention limits in your opinion?

Question10: What is the quality of the levelling in intervention limits in your opinion?

Question11: What is the quality of the frequency of the target reviews in your opinion?

Question12: What is the level of your participation in the target setting process of your own targets in your opinion?

Question13: How much the selected main targets are steering the practical operations to the right direction in your opinion?

Question14: How well your own targets are fulfilling the S.M.A.R.T definition?

Question15:How many of the important points are not noticed because they are not included in the hoshin kanri- sheets (main targets) in your opinion?

Performance Indicators (KPI's):

Question16: What is the quality of the selection of KPI's in your opinion (Most important KPI's are in place)?

Question17: How easy is the follow-up of the selected KPI's in your opinion?

Question18: How easy is the reporting of the selected KPI's in your opinion?

Question19: What is the quality of the KPI- visualization in your department in your opinion?

Question20: How well the deployment of the KPI's to the organization has been done in your opinion (Right KPI's at the right organization level)?

Improvement actions:

Question21: What is the quality of the improvement actions defined out of target deviations in your opinion?

Question22: What is the quality of the corrective actions follow-up process in your opinion?

Question23: What is the quality of the giving the responsibilities of the improvement actions in your opinion (right people are responsible for actions)?

Team board meetings:

Question24: What is the quality of the participation rate of the team board meetings in your department in your opinion (all needed important participants in place)?

Question25: What is the quality of the content of the team board meetings in your department in your opinion?

Question26: How much the team board meetings are helping you to reach your own targets in your opinion?

Question27: How sensible the team board meetings are in your opinion?

Question28: How much the team board meetings are adding value to your department in your opinion?

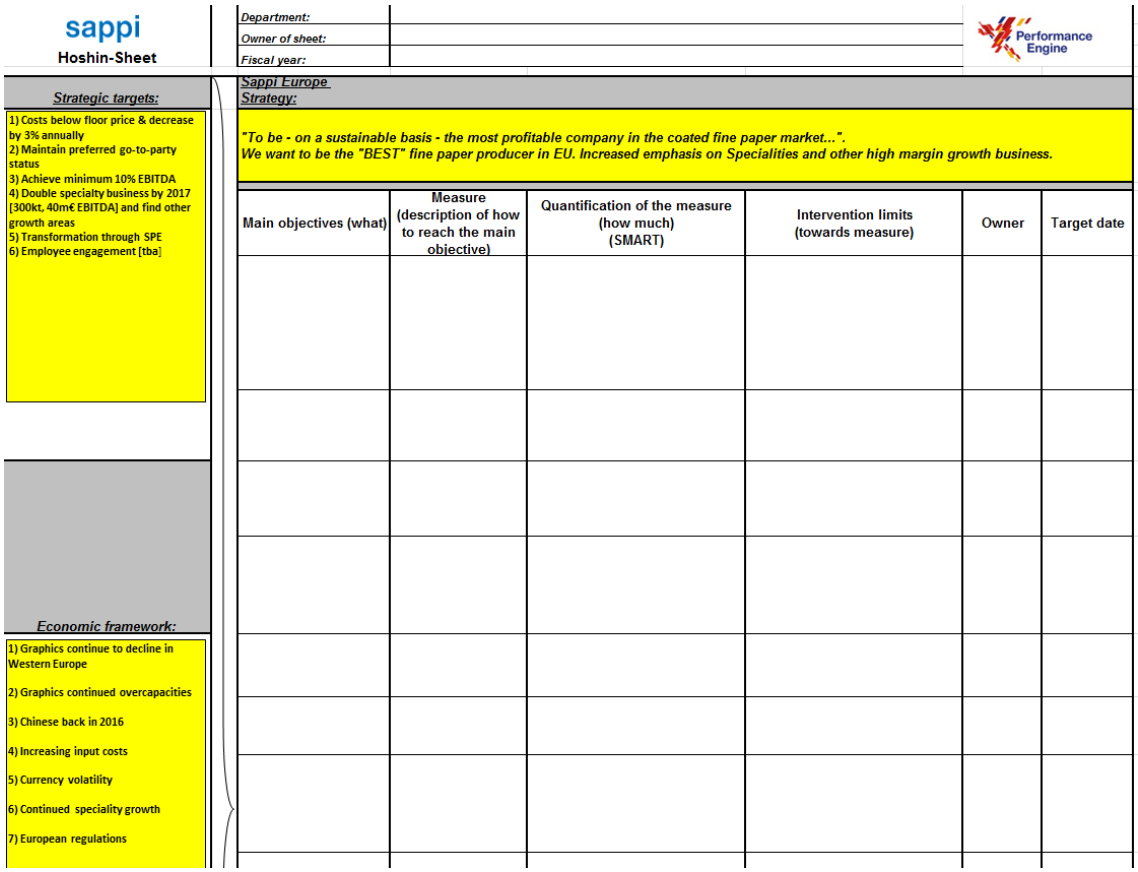
Question29: How much the team board meetings are adding value to the Kirkniemi Mill in your opinion?

Question30: What is the quality of the active participation in the team board meetings in your department in your opinion?

Question 31: What is the quality of the environment in team board meetings in your department in your opinion (silent, good lightning, enough space…)?

Question 32: What is the quality of the frequency of the team board meetings in your department in your opinion?

Appendix 3. Example: Hoshin Sheet



sappi

Hoshin-Sheet

Department:

Owner of sheet:

Fiscal year:

Performance Engine

Strategic targets:

1) Costs below floor price & decrease by 3% annually
2) Maintain preferred go-to-party status
3) Achieve minimum 10% EBITDA
4) Double specialty business by 2017 [300kt, 40m€ EBITDA] and find other growth areas
5) Transformation through SPE
6) Employee engagement [tba]

Economic framework:

1) Graphics continue to decline in Western Europe
2) Graphics continued overcapacities
3) Chinese back in 2016
4) Increasing input costs
5) Currency volatility
6) Continued speciality growth
7) European regulations

Sappi Europe Strategy:

"To be - on a sustainable basis - the most profitable company in the coated fine paper market...".
We want to be the "BEST" fine paper producer in EU. Increased emphasis on Specialities and other high margin growth business.

Main objectives (what)	Measure (description of how to reach the main objective)	Quantification of the measure (how much) (SMART)	Intervention limits (towards measure)	Owner	Target date